Attachment A

Flow Frequency Analysis Memo

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Piedmont Regional Office
4949-A Cox Road Glen Allen, Virginia 23060

SUBJECT: Flow Frequency Determination / 303(d) Status
Tides Utilities North WWTP – VA0029343

TO: Drew Hammond, P.E.

FROM: Jennifer Palmore, P.G.

DATE: July 16, 2010
REVISED: March 22, 2011; October 23, 2011

COPIES: File

The Tides Utilities North wastewater treatment plant discharges to a tributary of Church Prong and Carter Creek, near Christchurch, VA. The outfall is located at rivermile 3-XHZ000.20. Flow frequencies have been requested at this site for use in developing effluent limitations for the VPDES permit.

The cove is tidally influenced at the discharge location. Flow frequencies cannot be determined for tidal waters, therefore the previously determined dilution ratios should be used. The Virginia Water Quality Standards designates the area as saltwater and therefore the Aquatic Life saltwater criteria should be applied.

During the 2010 Water Quality Assessment, the stream was assessed as a Category 5A water body ("A Water Quality Standard is not attained. The water is impaired or threatened for one or more designated uses by a pollutant(s) and requires a TMDL (303d list).") The entire Rappahannock River Mesohaline segment (RPPMH), which includes the receiving stream, failed the Aquatic Life Use's submerged aquatic vegetation acreage criteria and the summer 30-day mean dissolved oxygen criteria; the applicable fact sheets are attached. The Recreation and Wildlife Uses were fully supporting. The Fish Consumption was considered as fully supporting with observed effects due to exceedance of an arsenic fish tissue screening value. The Shellfish Consumption Use was considered to be removed due to a VDH shellfish prohibition.

Tides Inn North was addressed in the Chesapeake Bay TMDL, which was approved by the EPA on 12/29/2010. The facility was considered a nonsignificant discharger and was therefore included in the aggregated total nitrogen, total phosphorus, and total suspended solids loads for wastewater discharges in the Rappahannock Mesohaline (RPPMH) segment. Because shellfish harvest in the area is prohibited by the VDH, the facility is not considered to directly impact shellfish waters and did not receive a wasteload allocation in the Carters Creek shellfish TMDL.

Stream data from monitoring station 3-CTR000.76 is attached. The station is located on mainstem Carter Creek at the pier at the end of Crockett's Lane, approximately 0.76 mile downstream of Ashburn Cove.

Although the receiving stream is considered impaired of the Aquatic Life Use, the impairment is due to segment-wide low dissolved oxygen and submerged aquatic vegetation violations and is not necessarily indicative of local water quality. Review of the data from station 3-CTR000.76 indicates only one dissolved oxygen value below the 30-day mean water quality standard out of 16 samples. In addition, all values were above the instantaneous and 7-day mean water quality standards. Due to this, Carter Creek and its tributaries are considered Tier 2 waters.

However, the Tides North facility began discharging before the Virginia Water Quality Standards were adopted. Therefore, the immediately surrounding area of Carter Creek that is influenced by the current discharge flow should be considered Tier 1.

If you have any questions concerning this analysis, please let me know.

2010 Fact Sheets for 303(d) Waters

RIVER BASIN: Rappahannock River Basin **HYDROLOGIC UNIT:** 02080104

STREAM NAME: **Rappahannock River**

TMDL ID: **RPPMH-DO-BAY** **2010 IMPAIRED AREA ID:** CB-RPPMH

ASSESSMENT CATEGORY: 5A **TMDL DUE DATE:** 2010

IMPAIRED SIZE: 123.53 - Sq. Mi. **Watershed:** VAP-E22E

INITIAL LISTING: 1998

UPSTREAM LIMIT: Mesohaline boundary

DOWNSTREAM LIMIT: Mouth at Chesapeake Bay

The mesohaline Rappahannock River and tidal tributaries.

CLEAN WATER ACT GOAL AND USE SUPPORT:

Aquatic Life Use - Not Supporting, Open Water Subuse - Not Supporting, Deep Water Subuse - Not Supporting, Deep Channel Use - Fully Supporting

IMPAIRMENT: Dissolved Oxygen

The mainstem of the Rappahannock River from Myrtle Swamp to its mouth was originally listed in 1998 by DEQ due to dissolved oxygen exceedances and nutrient overenrichment. The EPA extended the segment upstream to the confluence with Totuskey Creek. In the 2004 cycle dissolved oxygen exceedances were noted in deepwater and deep channel stations downstream of the confluence with Lancaster Creek (Morattico), which is further downstream.

The new Chesapeake Bay Water Quality Standards were implemented during the 2006 cycle. The mesohaline portion of the Rappahannock fails the Open Water Subuse's summer 30-day dissolved oxygen criteria and applicable areas fail the Deep Water 30-day dissolved oxygen criteria. During the 2008 cycle, the Deep Channel Subuse's instantaneous minimum dissolved oxygen criteria was violated, however the segment met the use during the 2010 cycle and will be delisted. The Open Water Subuse's 30-day rest-of-year standard was met and there was insufficient data to assess the other dissolved oxygen criteria.

IMPAIRMENT SOURCE: Point Source, Nonpoint Source

Tributary strategy has been developed.

RECOMMENDATION: Problem Characterization

2010 Fact Sheets for 303(d) Waters

RIVER BASIN: Rappahannock River Basin **HYDROLOGIC UNIT:** 02080104

STREAM NAME: **Rappahannock River - DELIST**

TMDL ID: **RPPMH-SAV-BAY** **2010 IMPAIRED AREA ID:** CB-RPPMH

ASSESSMENT CATEGORY: 2A **TMDL DUE DATE:** 2010

IMPAIRED SIZE: 123.53 - Sq. Mi. **Watershed:** VAP-E22E

INITIAL LISTING: 1998

UPSTREAM LIMIT: Mesohaline boundary

DOWNSTREAM LIMIT: Mouth at Chesapeake Bay

The mesohaline Rappahannock River and tidal tributaries.

CLEAN WATER ACT GOAL AND USE SUPPORT:

Aquatic Life Use - Fully Supporting, Shallow Water Subuse - Fully Supporting

IMPAIRMENT: Aquatic Macrophytes

The mainstem of the Rappahannock River from Myrtle Swamp to its mouth was originally listed in 1998 by DEQ due to dissolved oxygen exceedances and nutrient overenrichment. The EPA extended the segment upstream to the confluence with Totuskey Creek. In the 2004 cycle dissolved oxygen exceedances were noted in deepwater and deep channel stations downstream of the confluence with Lancaster Creek (Morattico), which is further downstream.

The new Chesapeake Bay Water Quality Standards were implemented during the 2006 cycle. The mesohaline portion of the Rappahannock failed the SAV acreage standards during the 2006, 2008, and 2010 cycles. However, during the 2010 cycle, the water clarity criteria was assessed and is meeting the Use, therefore the segment will be delisted.

IMPAIRMENT SOURCE:

The segment is meeting the water clarity criteria.

RECOMMENDATION: Delist

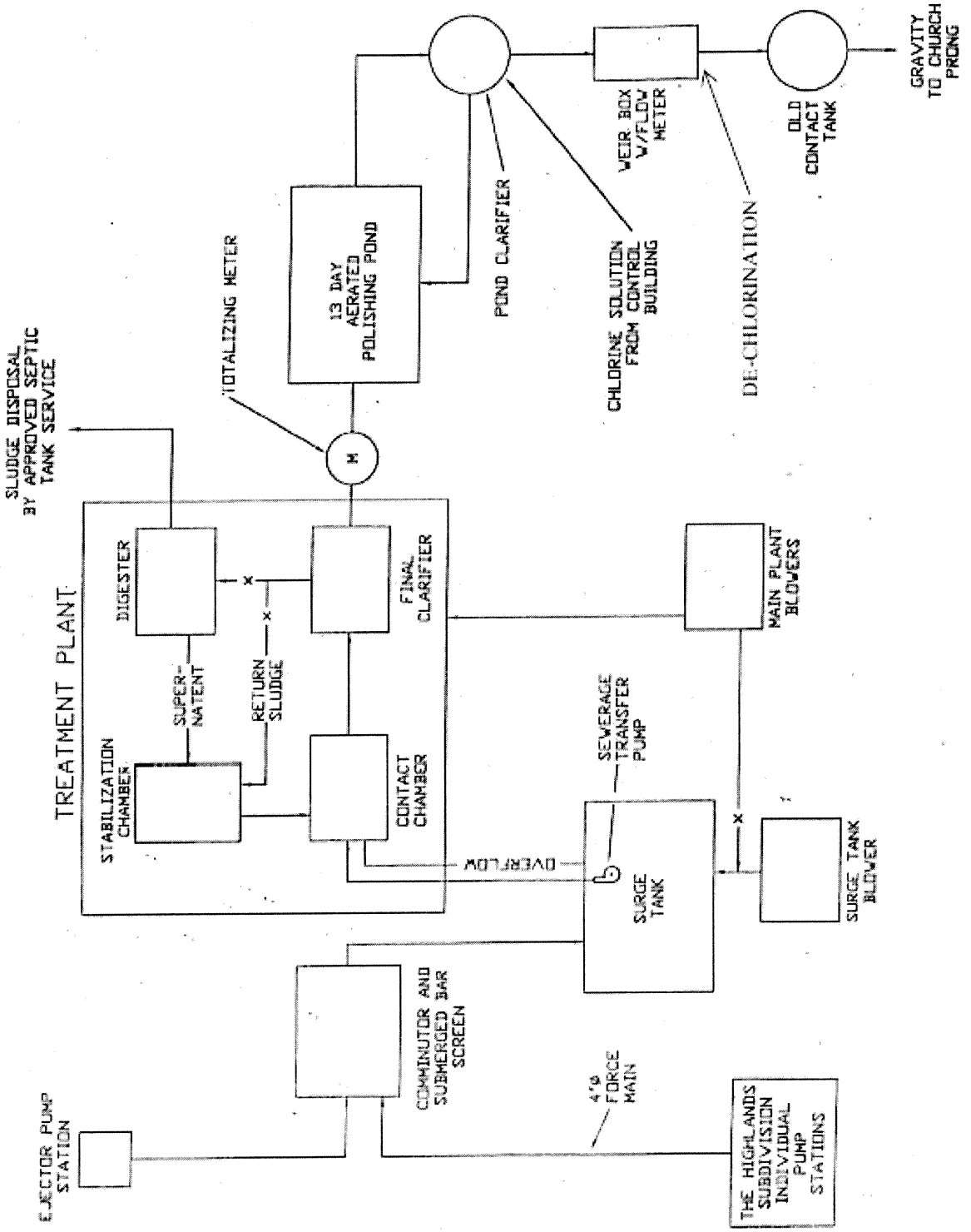
Facility Name: The Tides Utilities, LLC North Wastewater Treatment Plant
Permit No: VA0029343

Station ID	Collection Date	Temp Celcius	Depth Desc	Depth	Field Ph	Do Probe	Do Winkler	Salinity	Secchi Depth
3-CTR000.76	7/25/2000	24.81	B	1.50	7.59	5.76		13.50	
3-CTR000.76	7/25/2000	24.81	S	.30	7.62	5.91		13.50	
3-CTR000.76	7/25/2000	24.79	S	1.00	7.61	5.81		13.50	0.9
3-CTR000.76	2/22/2007	6.90	S	.30	7.40	12.10		12.20	
3-CTR000.76	4/9/2007	13.00	S	.30	8.10	10.30		11.30	
3-CTR000.76	6/5/2007	25.70	S	.30	7.90	8.30		12.30	
3-CTR000.76	8/23/2007	26.70	S	.30	7.80	6.50		17.00	
3-CTR000.76	10/30/2007	17.90	S	.30	7.70	7.50		18.60	
3-CTR000.76	12/20/2007	6.70	S	.30	7.60	10.30		19.90	
3-CTR000.76	2/27/2008	8.20	S	.30	7.90	**4.10**		17.50	
3-CTR000.76	2/29/2008	7.30	S	.30	7.10	10.70		16.80	
3-CTR000.76	4/23/2008	18.50	S	.30	7.80	8.30		13.90	
3-CTR000.76	6/23/2008	28.10	S	.30	7.90	7.20		11.20	
3-CTR000.76	8/6/2008	29.90	S	.30	8.20	7.10		14.70	
3-CTR000.76	10/9/2008	20.50	S	.30	7.90	7.40		17.30	
3-CTR000.76	12/17/2008	8.20	S	.30	7.80	10.20		18.80	
	10th %	7.1		**10th %**	7.5		**Avg.**	15.1	
	90th %	27.4		**90th %**	8.0				

Attachment B

Facility Flow Diagram

Revised Treatment Process Flow Diagram



Attachment C

Diffuser Modeling Results

VIRGINIA DEPARTMENT OF
ENVIRONMENTAL QUALITY
KILMARNOCK OFFICE
P. O. BOX 669
KILMARNOCK, VA 22482
(804) 435-3181

FAX COVER SHEET

DATE: 4-9-02

TO: Reed Barrows

FROM: Denise Mosca

SUBJECT: Tides Lodge dechlor (NORTH WWTP)

COMMENTS: The diffuser was installed last Monday - same design as was installed at (SOUTH WWTP) Tides Inn - they were informed by egr not to hook up dechlor ~~basin~~ unit but it is onsite + operator can install with 2 bolts -

NUMBER OF PAGES 10 (including transmittal sheet)

If any problems are encountered in the receipt of this transmission, please contact this office at 804 435-3181.

KILMARNOCK OFFICE FAX NO. 804 435-0485

UNIT PROCESS: Effluent/Plant Outfall

TIDES INN (SOUTH WWTP)

1. Type outfall: [ ] Shore based [x] Submerged

2. Type if shore based: [ ] Wingwall [ ] Headwall [ ] Rip Rap [x] N/A

3. Flapper valve? [ ] Yes [x] No

4. Erosion of bank? [ ] Yes* [x] No [ ] N/A

5. Effluent plume visible? [ ] Yes * [x] No

Comments: Submerged diffuser

6. Condition of outfall and supporting structures: [x] Good [ ] Fair [ ] Poor *

7. Final effluent, evidence of following problems:

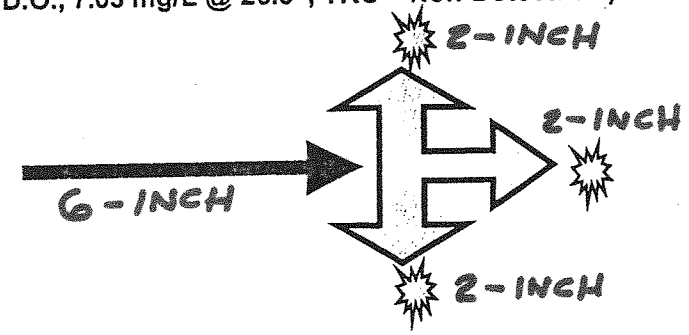
   a. Oil sheen? [ ] Yes* [x] No
   b. Grease? [ ] Yes* [x] No
   c. Sludge bar? [ ] Yes* [x] No
   d. Turbid effluent? [ ] Yes* [x] No
   e. Visible foam? [ ] Yes* [x] No
   f. Unusual odor? [ ] Yes* [x] No

DIFFUSER INFO:

Comments: The discharge flows by gravity to the old WWTP discharge location (submerged pipe; unable to see in receiving stream however slight upwelling was visible on the surface where diffusers are located). There are reportedly three diffusers separated by a few feet.

The effluent leaving the plant was fairly clear (pH = 7.8 S.U., D.O., 7.03 mg/L @ 26.5°, TRC = Non-Detectable).

Diffuser arrangement (from STP)



cc:

[x] Owner: c/o
[x] Operator: Mr. D. Allen Hall
[ ] Local Health Department:_____
[ ] VDH Engineering Field Office: Field Office
[x] VDH/Central Office - DWE
[x] DEQ - OWPS, attn: Bill Purcell
[x] DEQ – Piedmont Regional Office File
[x] DEQ – Kilmarnock Office File
[ ] EPA - Region III

To: Denise M. Mosca@KLMCK@DEQ
Cc:
Bcc:
From: Maynard D. Phillips@WPS@DEQ
Subject:
Date: Thursday, January 21, 1999 9:03:14 EST
Attach:
Certify: N
Forwarded by:

Denise,

I have looked at the Tides Inn/Lodge situation. I don't see that there would be a significant difference between the modeling I did for the Inn and what I would do for the lodge. I would recommend that you use the same dilution ratios for the Lodge that were applied to the Inn.

Dale.

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

KILMARNOCK OFFICE
P. O. BOX 669
KILMARNOCK, VA 22482
(804) 435-3181

FAX COVER SHEET

90th Temp of Disch 27
90th per. pH 8.16
Salinity 17.4 ‰
width of Creek 0.1 mi

DATE: 1-8-99

TO: Dale Phillips

FROM: Denise Mosca

SUBJECT: Cormix analysis for Tides Lodge

COMMENTS: I'm going to need a single port cormix anal. for the Lodge - In the past you've done analysis for Tides Inn, directly across the creek - The flow is somewhat less - (0.0325 MGD vs 0.0495 MGD) Could you please update the info & advise me if I could use the same 16:1 ratio - I enclose map -

NUMBER OF PAGES (10) (including transmittal sheet)

If any problems are encountered in the receipt of this transmission, please contact this office at 804 435-3181.

KILMARNOCK OFFICE FAX NO. 804 435-0485

BAY DESIGN GROUP
engineering, surveying & land planning

Name: Denise Mosca
Organization: DEQ
Fax: 804/435-0485
Phone: 804/435-3181
From: Don Caskie
Date: January 8, 1999 (11:00AM)
Subject: VA0029343 Application for Re-issuance; Tides Lodge diffuser information

File: \\Server\D_DRIVE\Tides Inn\98163-01\diffusor model info.88163.wpd

For the purpose of modeling the discharge from the Tides Lodge treatment facility, I provide the following:

Tidal Range at the site ..... mean = 1.3 feet
Max tidal velocity at site: During the next year there are 36 occurrences when the maximum tidal velocity will be equal to or greater than 1.0 knot. The maximum tidal velocity of 1.2 knots will occur twice; once at 10:54 PM on May 15th and again at 11:45 PM on May 16th. The average maximum velocity for flood tide is 0.6 knots and 0.5 knots for ebb.
Average depth of stream ..... six feet
Depth of diffusor ..... -1.0 mean low water
Length of diffusor ..... 6 feet from shoreline
Number of ports 1
Distance of 1st port from bank ..... 6'

Note: Today pond is iced over and there is no discharge.

P. O. Box 895 Gloucester, Virginia 23061
804 693 2993. Fax 804 693 5596
E-mail bdgglo@inna.net

Please Respond To
P. O. Box 509 Saluda, Virginia 23149
804 758 5678 Fax 804 758 5920
E-mail bdgsal@inna.net


Sharon Ch
BM 48
Christ Church
Historic Site
Cem
BM 30
Pitmans Corner
Golf Course
Bones and Dead Prong
Church Creek
Golf Course
North Weems
West Irvington
Irvington
Chesapeake Academy
Old Mill Cove
Dunton Cove
Sams Cove
Currell Cove
Bridge Cove
Carter Creek
Carter Cove
Galley Hook Point
Light
Eastern Branch
Crab Point
Yopps Cove
Jacks Cove
James Cove
Weems
Light
Cem
Mt Vernon Ch
Sanders Cove
Tidal Flat
BM 34
Tollgate
Cem
BRIDGE
632
634
638
637
659

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
Water Division
4900 Cox Road Glen Allen, Virginia 23060

F

MEMORANDUM

Subject: Tides Inn Diffuser Calculations

To: Denice Mosca, KRO

From: M. Dale Phillips,OWRM Dale

Date: May 11, 1994

Copies: File

I have made the CORMIX runs you requested. The multiport runs should be considered approximate because the model cannot faithfully model the proposed port configuration. However, the results should be sufficiently reliable to base ammonia limits on.

The dilution available for the single port diffuser is about 16:1.

The dilution available for the multiport diffuser is at least double that. Since the results are approximate, I would suggest that you use 32:1.

CORMIX2 PREDICTION FILE:
2222222222222222222222222222222222222222222222222222222222222222222222222222

CORNELL MIXING ZONE EXPERT SYSTEM

Subsystem CORMIX2: Subsystem version:
Submerged Multiport Diffuser Discharges CMX2_v.2.10 May_1993

CASE DESCRIPTION
Site name/label: tidein2
Design case: may^11^1994
FILE NAME: cormix\sim\tidein2 .cx2
Time of Fortran run: 05/11/94--08:04:48

Multiport

ENVIRONMENT PARAMETERS (metric units)
Bounded section

BS	=	152.40	AS	=	304.80	QA	=	.00			
HA	=	2.00	HD	=	1.50						
UA	=	.000	F	=	.156	USTAR	=	.0000E+00			
UW	=	2.000	UWSTAR	=	.2198E-02						

Uniform density environment
STRCND= U RHOAM = 1150.0000

DIFFUSER DISCHARGE PARAMETERS (metric units)
DITYPE=alternating_perpendicular
BETYPE=alternating_with_fanning

BANK	=	LEFT	DISTB	=	9.00	YB1	=	8.00	YB2	=	10.00
LD	=	2.00	NOPEN	=	3	SPAC	=	1.00			
D0	=	.050	A0	=	.002	H0	=	.05			
GAMMA	=	90.00	THETA	=	90.00						
SIGMA	=	.00	BETA	=	90.00						
U0	=	.849	Q0	=	.005		=	.5000E-02			
RHO0	=	850.0000	DRHO0	=	.3000E+03	GP0	=	.2558E+01			
C0	=	.1000E+04	CUNITS	=	ppm						
IPOLL	=	1	KS	=	.0000E+00	KD	=	.0000E+00			

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)

q0	=	.2500E-02	m0	=	.2121E-02	j0	=	.6396E-02	SIGNJ0=		1.0

Associated 2-d length scales (meters)

lQ=B	=	.003	lM	=	.06	lm	=	99999.00			
lmp	=	99999.00	lbp	=	99999.00	la	=	99999.00			

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)

Q0	=	.5000E-02	M0	=	.4243E-02	J0	=	.1279E-01			

Associated 3-d length scales (meters)

LQ	=	.08	LM	=	.15	Lm	=	99999.00	Lb	=	99999.00
						Lmp	=	99999.00	Lbp	=	99999.00

NON-DIMENSIONAL PARAMETERS

FR0	=	9.77	FRD0	=	2.37	R	=	99999.00
(slot)			(port/nozzle)					

FLOW CLASSIFICATION
22222222222222222222222222222222222222
2 Flow class (CORMIX2) = MU1V 2
2 Applicable layer depth HS = 1.50 2
22222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
C0 = .1000E+04 CUNITS= ppm

```
 NTOX   =  0
 NSTD   =  0
 REGMZ  =  0
 XINT   =    5000.00  XMAX   =    5000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
         9.00 m  from the LEFT  bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP = 25 display intervals per module
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)

       X         Y         Z         S         C         BV        BH
      .00       .00       .05       1.0  .100E+04      .00      1.00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
BEGIN MOD221: WEAKLY DEFLECTED PLANE PLUME IN CROSSFLOW

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)

       X         Y         Z         S         C         BV        BH
      .00       .00       .05       1.0  .100E+04      .00      1.00
      .00       .00       .09       2.7  .365E+03      .01      1.01
      .00       .00       .14       4.5  .223E+03      .02      1.01
      .00       .00       .18       6.2  .161E+03      .02      1.02
      .00       .00       .22       8.0  .126E+03      .03      1.03
      .00       .00       .27       9.7  .103E+03      .04      1.03
      .00       .00       .31      11.5  .873E+02      .04      1.04
      .00       .00       .35      13.2  .758E+02      .05      1.05
      .00       .00       .40      14.9  .670E+02      .06      1.05
      .00       .00       .44      16.7  .600E+02      .06      1.06
      .00       .00       .49      18.4  .543E+02      .07      1.07
      .00       .00       .53      20.2  .496E+02      .08      1.07
      .00       .00       .57      21.9  .457E+02      .08      1.08
      .00       .00       .62      23.6  .423E+02      .09      1.08
      .00       .00       .66      25.4  .394E+02      .10      1.09
      .00       .00       .70      27.1  .369E+02      .10      1.10
      .00       .00       .75      28.9  .346E+02      .11      1.10
      .00       .00       .79      30.6  .327E+02      .11      1.11
      .00       .00       .83      32.4  .309E+02      .12      1.12
      .00       .00       .88      34.1  .293E+02      .13      1.12
      .00       .00       .92      35.8  .279E+02      .13      1.13
      .00       .00       .96      37.6  .266E+02      .14      1.14
      .00       .00      1.01      39.3  .254E+02      .15      1.14
      .00       .00      1.05      41.1  .244E+02      .15      1.15
      .00       .00      1.09      42.8  .234E+02      .16      1.16
```

```
      .00       .00     1.14     44.5   .225E+02       .7       1.16
 Cumulative travel time =            0. sec

END OF MOD221: WEAKLY DEFLECTED PLANE PLUME IN CROSSFLOW
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
BEGIN MOD232: LAYER BOUNDARY IMPINGEMENT/UPSTREAM SPREADING

  Vertical angle of layer/boundary impingement    =      89.86 deg
  Horizontal angle of layer/boundary impingement  =        .00 deg
 UPSTREAM INTRUSION PROPERTIES:
        Upstream intrusion length                 =      52.20 m
        X-position of upstream stagnation point =     -52.20 m
        Thickness in intrusion region             =       1.50 m
        Half-width at downstream end              =  397170.10 m
        Thickness at downstream end               =       1.50 m

 In this case, the upstream INTRUSION IS VERY LARGE, exceeding 10 times
   the local water depth.
 This may be caused by a very small ambient velocity, perhaps in
   combination with large discharge buoyancy.
 If the ambient conditions are strongly transient (e.g. tidal), then the
   CORMIX steady-state predictions of upstream intrusion are probably
   unrealistic.
 The plume predictions prior to boundary impingement and wedge formation
   will be acceptable, however.

 Plume width as a function of position:
   X:    -52.20 28324.55 56701.30 85078.05 ******** ******** ******** ********
   BH:       .00 ******** ******** ******** ******** ******** ******** ********

 Profile definitions:
   BV = top-hat thickness, measured vertically
   BH = top-hat half-width, measured horizontally in y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)

  Control volume inflow:
       X         Y        Z         S        C        BV        BH
       .00       .00    1.14     44.5   .225E+02     .33      1.16

  Control volume outflow:
       X         Y        Z         S        C        BV        BH       ZU       ZL
 198585.00       .00     1.50    714.9   .140E+01    1.50 ********     1.50      .00
 Cumulative travel time = 66195010000. sec

END OF MOD232: LAYER BOUNDARY IMPINGEMENT/UPSTREAM SPREADING
-------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

 At the end of the NFR, the plume POSITION EXCEEDS SPECIFIED LIMITS
   for the regulatory mixing zone (RMZ) and/or the region of interest (ROI).
 Specifications may be overly restrictive.
   Use larger ROI values in subsequent iteration!
 SIMULATION ENDS.
-------------------------------------------------------------------------------
CORMIX2: Submerged Multiport Diffuser Discharges       End of Prediction File
22222222222222222222222222222222222222222222222222222222222222222222222222
```

```
CORMIX1 PREDICTION FILE:
1111111111111111111111111111111111111111111111111111111111111111111111111111
                    CORNELL MIXING ZONE EXPERT SYSTEM
Subsystem CORMIX1:                                        Subsystem version:
 Submerged Single Port Discharges          CMX1_v.2.10_____________May_1993
------------------------------------------------------------------------------
------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:          tides^inn
 Design case:              May^11^1994
 FILE NAME:                cormix\sim\tidesinn.cx1
 Time of Fortran run:      05/11/94--07:47:41

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    152.40  AS    =    304.80  QA    =       .00
 HA    =      2.00  HD    =      1.50
 UA    =       .000 F     =       .156 USTAR = .0000E+00
 UW    =      2.000 UWSTAR= .2198E-02
 Uniform density environment
 STRCND=  U         RHOAM = 1150.0000

DISCHARGE PARAMETERS (metric units)
 BANK  =  LEFT      DISTB =      8.00
 D0    =       .150 A0    =       .018 H0    =       .05
 THETA =       .00  SIGMA =    270.00
 U0    =       .113 Q0    =       .002       = .2000E-02
 RHO0  =  850.0000  DRHO0 = .3000E+03  GP0   = .2558E+01
 C0    = .1000E+04  CUNITS=  ppm
 IPOLL =  1         KS    = .0000E+00  KD    = .0000E+00

FLUX VARIABLES (metric units)
 Q0    = .2000E-02  M0    = .2264E-03  J0    = .5117E-02  SIGNJ0=      1.0
 Associated length scales (meters)
 LQ    =       .13  LM    =       .03  Lm    =  99999.00  Lb    =  99999.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =       .18  R     =  99999.00

FLOW CLASSIFICATION
 1111111111111111111111111111111111111111
 1  Flow class (CORMIX1)       =    H4-90  1
 1  Applicable layer depth HS =     1.50  1
 1111111111111111111111111111111111111111

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    = .1000E+04  CUNITS=  ppm
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   5000.00  XMAX  =   5000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and below the center of the port:
         8.00 m  from the LEFT  bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP = 25 display intervals per module
------------------------------------------------------------------------------
------------------------------------------------------------------------------
```

Single Port

BEGIN MOD101: DISCHARGE MODULE (FLOW ESTABLISHMENT)

X	Y	Z	S	C	B
.00	.00	.05	1.0	.100E+04	.08

END OF MOD101: DISCHARGE MODULE (FLOW ESTABLISHMENT)

BEGIN MOD111: WEAKLY DEFLECTED JET IN CROSSFLOW

CROSSFLOWING DISCHARGE

This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD111: WEAKLY DEFLECTED JET IN CROSSFLOW

BEGIN MOD121: WEAKLY DEFLECTED PLUME IN CROSSFLOW

Profile definitions:
B = Gaussian 1/e (37%) half-width, normal to trajectory
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

X	Y	Z	S	C	B
.00	.00	.05	1.0	.100E+04	.03
.00	-277.04	.10	1.3	.771E+03	.04
.00	-351.90	.14	1.6	.615E+03	.04
.00	-405.86	.19	2.0	.504E+03	.05
.00	-449.83	.24	2.4	.423E+03	.05
.00	-487.72	.28	2.8	.360E+03	.06
.00	-521.44	.33	3.2	.311E+03	.06
.00	-552.09	.37	3.7	.272E+03	.07
.00	-580.36	.42	4.2	.240E+03	.07
.01	-606.71	.47	4.7	.214E+03	.08
.01	-631.47	.51	5.2	.192E+03	.08
.01	-654.91	.56	5.8	.173E+03	.09
.01	-677.19	.61	6.3	.158E+03	.09
.01	-698.48	.65	6.9	.144E+03	.10
.01	-718.90	.70	7.6	.132E+03	.10
.01	-738.53	.75	8.2	.122E+03	.11
.01	-757.46	.79	8.9	.113E+03	.11
.01	-775.76	.84	9.6	.105E+03	.12
.01	-793.49	.89	10.3	.973E+02	.12
.01	-810.69	.93	11.0	.909E+02	.13
.01	-827.41	.98	11.7	.851E+02	.13
.01	-843.68	1.02	12.5	.799E+02	.14
.02	-859.54	1.07	13.3	.752E+02	.14
.02	-875.01	1.12	14.1	.709E+02	.15
.02	-890.13	1.16	14.9	.670E+02	.15
.02	-904.91	1.21	15.8	.635E+02	.16

Cumulative travel time = 1. sec

END OF MOD121: WEAKLY DEFLECTED PLUME IN CROSSFLOW

BEGIN MOD132: LAYER BOUNDARY IMPINGEMENT/UPSTREAM SPREADING

Vertical angle of layer/boundary impingement = .18 deg
Horizontal angle of layer/boundary impingement = 270.00 deg

```
UPSTREAM INTRUSION PROPERTIES:
        Upstream intrusion length                    =      23.53 m
        X-position of upstream stagnation point      =     -23.51 m
        Thickness in intrusion region                =        .74 m
        Half-width at downstream end                 =  218923.00 m
        Thickness at downstream end                  =        .74 m

 In this case, the upstream INTRUSION IS VERY LARGE, exceeding 10 times
   the local water depth.
 This may be caused by a very small ambient velocity, perhaps in
   combination with large discharge buoyancy.
 If the ambient conditions are strongly transient (e.g. tidal), then the
   CORMIX steady-state predictions of upstream intrusion are probably
   unrealistic.
 The plume predictions prior to boundary impingement will be
   acceptable, however.

 Plume width as a function of position:
   X:    -23.51 15617.21 31257.92 46898.64 62539.35 78180.06 93820.78 ********
   BH:      .00 82745.10 ******** ******** ******** ******** ******** ********

 Profile definitions:
   BV = top-hat thickness, measured vertically
   BH = top-hat half-width, measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)

  Control volume inflow:
       X         Y        Z         S         C        B
      .02   -904.91     1.21     15.8   .635E+02     .16

  Control volume outflow:
       X         Y        Z         S         C        BV        BH       ZU       ZL
 109461.50   -904.91     1.50     483.1   .207E+01     .74 ********     1.50      .76
 Cumulative travel time = 36487160000. sec

END OF MOD132: LAYER BOUNDARY IMPINGEMENT/UPSTREAM SPREADING
-------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

 At the end of the NFR, the plume POSITION EXCEEDS SPECIFIED LIMITS
   for the regulatory mixing zone (RMZ) and/or the region of interest (ROI).
 Specifications may be overly restrictive.
   Use larger ROI values in subsequent iteration!
 SIMULATION ENDS.
-------------------------------------------------------------------------------
CORMIX1: Submerged Single Port Discharges                End of Prediction File
11111111111111111111111111111111111111111111111111111111111111111111111111111
```

Mosca,Denise

From: Brockenbrough,Allan
Sent: Thursday, April 22, 2004 9:58 AM
To: Mosca,Denise
Cc: Palmore,Jennifer
Subject: RE: Tides Lodge

Hey Denise-

Sorry for the delay in getting back to you. By definition, the wla multipliers are all 1 for "end-of-pipe" limits. No dilution is available. For a Tier 2 water you are going to get wla's equal to 1/4 the water quality criteria. They really need to construct a submerged diffuser in deeper water to get any kind of reasonable mixing. Give me a call if we need to discuss further.

Allan

-----Original Message-----
From: Mosca,Denise
Sent: Friday, April 16, 2004 11:44 AM
To: Brockenbrough,Allan
Cc: Palmore,Jennifer
Subject: Tides Lodge

Hi, I proceeded with end of pipe limits for this facility as you recommended. We went around on a tier designation for the Tides Lodge discharge location and settled on Tier 2. I need to run mstranti for the baselines and attach it in my fact sheet to satisfy antidegradation. I'll still need multipliers from you then for the WLAs.
Denise

Attachment D

Topographic Map

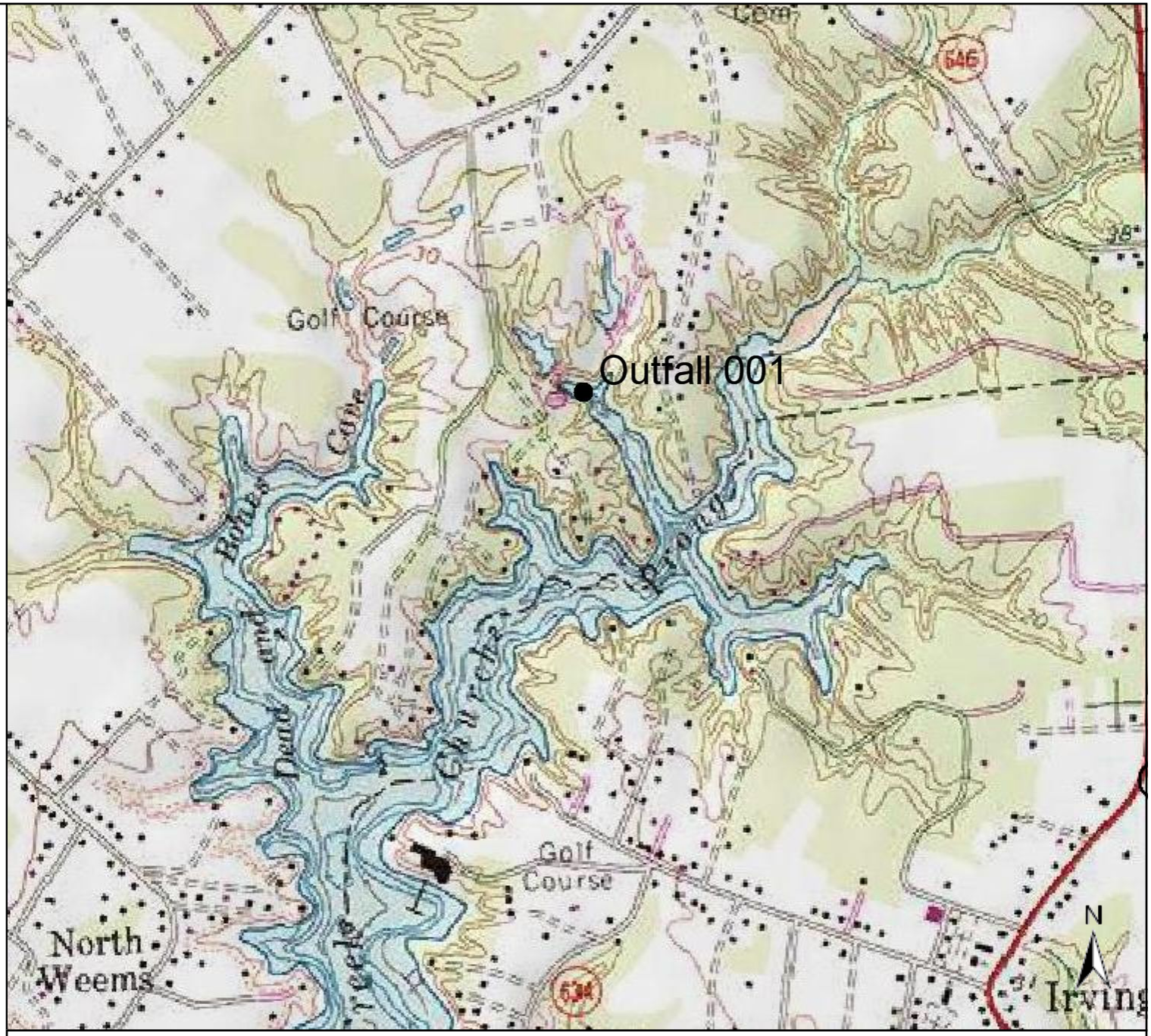
VEGIS Map Export

Legend

DEQ Central & Regional Offices

- DEQ Central Office, 629 East Main Street, Richmond, VA 23219
- 1 South West Regional Office, 355 Deadmore St SE, Abingdon, VA 24210
- 2 Blue Ridge Regional Office, 3019 Peters Creek Road NW, Roanoke, VA 24019
- 2 Blue Ridge Regional Office, 7705 Timberlake Road, Lynchburg, VA 24502
- 3 Northern Virginia Regional Office, 13901 Crown Court, Woodbridge, VA 22193
- 4 Piedmont Regional Office, 4949-A Cox Road, Glen Allen, VA 23060
- 5 Tidewater Regional Office, 5636 Southern Blvd, Virginia Beach, VA 23462
- 6 Valley Regional Office, 4411 Early Road, Harrisonburg, VA 22801

DEQ Regional Boundaires



Title: The Tides Utilities, LLC - North WWTP **Date: 3/21/2011**

Feet

0 200400600800

1:12,000 / 1"=1,000 Feet

Attachment E

Site Inspection Report

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Piedmont Regional Office

4949-A Cox Rd Glen Allen, VA 23060 (804) 527-5020

SUBJECT: Site Visit- The Tides Inn, LLC North WWTP VA0029343 (formerly Tides Golf Lodge WWTP)

TO: File

FROM: Janine Howard, PRO

DATE: 24 August 2010

This site visit took place on August 23, 2010. Ray Jenkins and I met with Tides Inn operator Allen Hall. The facility is located in Irvington, VA on State Route 757 (Figure 1). The facility treats wastewater from approximately 36 condo units in "The Greens Association" housing development as well as a restaurant. The Tides Lodge has been closed for approximately 6 years and no longer discharges to the treatment plant.

The facility is permitted for 32,500 gpd, however the flow is generally 1,000-2,000 gpd. Three pump stations direct wastewater to the facility. The influent flows through a bar screen/comminutor to the flow equalization basin (Figure 3). The equalization basin appeared to be adequately aerating. The activated sludge aeration basin consists of contact stabilization and re-aeration tanks. Three blowers supply the diffused air and aeration and activated sludge return are operated on a timer, 15 minutes on and 30 minutes off. Sludge is wasted as necessary to meet the target settleability value. There are three secondary clarifiers, operated in series that discharge to the polishing pond. The facility is, in places, open to the air. In an effort to combat leaves, which were entering the treatment system and clogging the pumps, the operator has installed screens on all openings in the plant. These screens have been effective at preventing leaf deposition. The polishing pond, about 15 feet deep, is approximately 85% covered with duckweed (Figure 4). Allen Hall maintains the duckweed cover, even after natural die back as it limits algal growth by blocking sunlight. The effluent then flows to the chlorine contact tank. The chlorine is a tablet feed system and a 30 minute contact time is achieved. Sodium sulfite tablets are used to dechlorinate prior to discharge via a v-notch weir (Figure 5). The outfall discharges at the head of Ashburn Cove, part of Carter's Creek. During low tide the pipe is visible above water.

The facility was repainted in the last year and appears well maintained. The package plant was built in 1965 and taking into consideration the age of the basins, a 6 foot deep concrete retaining wall was erected surrounding the facility as a safety measure for leaks (Figure 2).

At the time of the 2005 permit reissuance, a two-stage flow expansion to 0.04 MGD and later 0.1 MGD was planned in addition to plant upgrade. The facility will remain permitted for a discharge of 0.1 MGD (the 0.04 MGD tier is no longer requested by the permittee); however, the upgrade/expansion is on hold indefinitely due to economic factors.

Figure 1. Tides North WWTP perimeter

Figure 2. Retaining wall

Figure 3. Equalization tanks and screens to prevent leaf deposition.

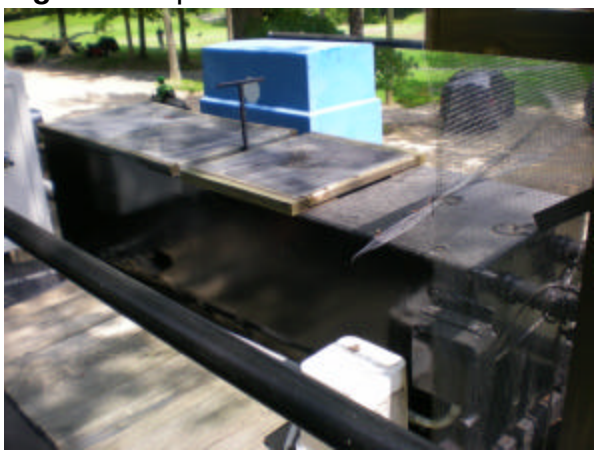


Figure 4. Polishing Pond

Figure 5. Final Effluent at V-notch weir prior to discharge to Ashburn Cove

Attachment F

Effluent DMR Data

Facility Name: The Tides Utilities, LLC North WWTP
Permit No: VA0029343
Outfall: 001

DMR Due Date	Flow		BOD_5			
	Monthly Avg.	Maximum	Monthly Avg.		Weekly Avg.	
	MGD	MGD	mg/L	kg/d	mg/L	kg/d
12/10/07	.0080	.0151	3	.0761	3	.0761
1/10/08	0.0048	0.0151	5	.1363	5	.1363
2/10/08	.0019	.0065	5	.0568	5	.0568
3/10/08	.0021	.0082	9	.1022	9	.1022
4/10/08	0.0058	0.0096	8	.1787	8	.1787
5/10/08	.0059	.0118	9	.2316	9	.2316
6/10/08	0.0074	0.0129	6	.3691	8	.3691
7/10/08	0.0061	0.0105	3	.0545	3	.0545
8/10/08	0.0057	0.0097	2	.0553	2	.0553
9/10/08	0.0053	0.0089	2	0.0341	2	0.0341
10/10/08	0.0055	0.0124	9	0.0749	9	0.0749
11/10/08	0.0049	0.0092	3	.0352	3	.0352
12/10/08	0.0019	0.0048	12	.2180	12	.2180
1/10/09	0.0014	0.0084	11	0.0291	11	0.0291
2/10/09	0.0006	0.0020	4	.0303	4	.0303
3/10/09	0.0004	0.0018	6	.0091	6	.0091
4/10/09	0.0016	0.0086	9	.0238	9	.0238
5/10/09	0.0025	0.0173	5	.0814	5	.0814
6/10/09	0.0050	0.0088	3	.0488	3	.0488
7/10/09	0.0060	0.0173	8	.0969	8	.0969
8/10/09	0.0066	0.0173	15	.4883	15	.4883
9/10/09	0.0067	0.0216	3	.0488	3	.0488
10/10/09	0.0057	0.0173	3	.0977	3	.0977
11/10/09	0.0028	0.0130	2	.0106	2	.0106
12/10/09	0.0045	0.0173	21	.0556	21	.0556
1/10/10	0.0049	0.0173	4	.0212	4	.0212
2/10/10	0.0022	0.0108	4	.0212	4	.0212
3/10/10	0.0019	0.0072	3	.0329	3	.0329
4/10/10	0.0054	0.0432	12	.1317	12	.1317
5/10/10	0.0056	0.0096	7	.1139	7	.1139
6/10/10	0.0036	0.0096	4	.0439	4	.0439
7/10/10	0.0043	0.0173	6	.0318	6	.0318
8/10/10	0.0044	0.0123	5	.0662	5	.0662
9/10/10	0.0042	0.0096	3	.0318	3	.0318
10/10/10	0.0056	0.0432	4	.0348	4	.0348
11/10/10	0.0048	0.0432	2	.0288	2	.0288

Facility Name: The Tides Utilities, LLC North WWTP
Permit No: VA0029343
Outfall: 001

DMR Due Date	TSS				Total Residual Chlorine	
	Monthly Avg.		Weekly Avg.		Monthly Avg.	Weekly Avg.
	mg/L	kg/d	mg/L	kg/d	ug/L	ug/L
12/10/07	4	.1014	4	.1014	<QL	<QL
1/10/08	1	.0273	1	.0273	<QL	<QL
2/10/08	3.2	.0363	3.2	.0363	<QL	<QL
3/10/08	9	.1022	9	.1022	<QL	<QL
4/10/08	8.7	.1943	8.7	.1943	<QL	<QL
5/10/08	8	.2059	8	.2059	<QL	<QL
6/10/08	9.6	.3992	10	.4504	<QL	<QL
7/10/08	3.4	.0618	3.4	.0618	<QL	<QL
8/10/08	2.1	.0580	2.1	.0580	<QL	<QL
9/10/08	2.1	0.0358	2.1	0.0358	<QL	<QL
10/10/08	4.3	0.0358	4.3	0.0358	<QL	<QL
11/10/08	4	.0469	4	.0469	<QL	<QL
12/10/08	8	.1453	8	.1453	<QL	<QL
1/10/09	4.2	0.0111	4.2	0.0111	<QL	<QL
2/10/09	3.6	.0273	3.6	.0273	<QL	<QL
3/10/09	5.5	.0083	5.5	.0083	<QL	<QL
4/10/09	8.1	.0215	8.1	.0215	<QL	<QL
5/10/09	6.5	.1058	6.5	.1058	<QL	<QL
6/10/09	12	.1953	12	.1953	<QL	<QL
7/10/09	11	.1332	11	.1332	<QL	<QL
8/10/09	17	.5534	17	.5534	<QL	<QL
9/10/09	8.8	.1432	8.8	.1432	<QL	<QL
10/10/09	2.7	.0879	2.7	.0879	<QL	<QL
11/10/09	1.1	.0058	1.1	.0058	<QL	<QL
12/10/09	1.3	.0034	1.3	.0034	<QL	<QL
1/10/10	15	.0795	30	0.1590	<QL	<QL
2/10/10	<1.0	.0053	<1.0	.0053	<QL	<QL
3/10/10	1.0	.0110	1.0	.0110	<QL	<QL
4/10/10	5.6	.0615	5.6	.0615	<QL	<QL
5/10/10	8.7	.1416	8.7	.1416	<QL	<QL
6/10/10	5.5	.0604	5.5	.0604	<QL	<QL
7/10/10	1.3	.0069	1.3	.0069	<QL	<QL
8/10/10	3.4	.0450	3.4	.0450	<QL	<QL
9/10/10	1.3	.0138	1.3	.0138	<QL	<QL
10/10/10	1.4	.0122	1.4	.0122	<QL	<QL
11/10/10	1	.0144	1	.0144	<QL	<QL

Facility Name: The Tides Utilities, LLC North WWTP
Permit No: VA0029343
Outfall: 001

DMR Due Date	Ammonia-Nitrogen		Oil & Grease	
	Monthly Avg.	Weekly Avg.	Monthly Avg.	Weekly Avg.
	mg/L	mg/L	mg/L	mg/L
12/10/07	<0.10	<0.10	<5.0	<5.0
1/10/08	<0.10	<0.10	<5	<5
2/10/08	<.10	<.10	<5.0	<5.0
3/10/08	<0.10	0.10	<5	<5
4/10/08	0.15	0.15	<5.0	<5.0
5/10/08	<0.10	<0.10	<5.0	<5.0
6/10/08	<0.10	<0.10	<5	<5
7/10/08	0.26	0.47	<5.0	<5.0
8/10/08	<0.10	<0.10	<5.0	<5.0
9/10/08	<0.10	<0.10	<5.0	<5.0
10/10/08	<.10	<.10	<5.0	<5.0
11/10/08	<.10	<.10	<5.0	<5.0
12/10/08	<0.10	<0.10	<5.0	<5.0
1/10/09	<0.10	<0.10	<5	<5
2/10/09	<0.10	<0.10	NULL	NULL
3/10/09	<0.10	<0.10	<5	<5
4/10/09	0.11	0.11	NULL	NULL
5/10/09	0.11	0.11	<5	<5
6/10/09	0.12	0.12	NULL	NULL
7/10/09	0.14	0.14	<5	<5
8/10/09	0.12	0.12	10.1	10.1
9/10/09	<0.1	<0.1	<5	<5
10/10/09	<0.10	<0.10	<5.0	<5.0
11/10/09	<0.10	<0.10	<5.0	<5.0
12/10/09	<0.10	<0.10	<5.0	<5.0
1/10/10	<0.10	<0.10	7.8	7.8
2/10/10	<0.10	<0.10	<5.0	<5.0
3/10/10	<0.10	<0.10	<5.0	<5.0
4/10/10	0.11	0.11	<5.0	<5.0
5/10/10	0.13	0.13	<QL	<QL
6/10/10	0.10	0.10	<5.0	<5.0
7/10/10	0.13	0.13	<5.0	<5.0
8/10/10	<0.10	<0.10	<5.0	<5.0
9/10/10	<0.10	<0.10	<5.0	<5.0
10/10/10	<0.10	<0.10	<5.0	<5.0
11/10/10	<0.10	<0.10	<5.0	<5.0

Facility Name: The Tides Utilities, LLC North WWTP
Permit No: VA0029343
Outfall: 001

DMR Due Date	pH		Fecal Coliform
	Minimum	Maximum	Monthly Geo. Mean
	s.u.	s.u.	N / 100 mL
12/10/07	7.98	8.43	2
1/10/08	8.16	8.49	<2
2/10/08	8.42	8.80	<2
3/10/08	8.53	8.82	8
4/10/08	8.54	8.99	6
5/10/08	7.92	8.99	2
6/10/08	7.69	8.05	42
7/10/08	7.94	8.25	40
8/10/08	7.87	8.36	23
9/10/08	7.90	8.25	2
10/10/08	8.12	8.38	6
11/10/08	8.23	8.42	8
12/10/08	8.21	8.68	2
1/10/09	8.34	8.65	<2
2/10/09	8.18	8.51	2
3/10/09	8.32	8.74	2
4/10/09	8.75	9.0	2
5/10/09	8.38	8.99	2
6/10/09	8.20	8.45	2
7/10/09	8.04	8.40	4
8/10/09	8.00	8.48	14
9/10/09	7.85	8.31	2
10/10/09	7.99	8.40	2
11/10/09	7.72	8.50	2
12/10/09	7.63	8.15	2
1/10/10	7.12	7.98	<2
2/10/10	7.57	8.08	<2
3/10/10	7.60	8.40	2
4/10/10	8.25	9.0	2
5/10/10	8.09	9.0	2
6/10/10	7.85	8.24	2
7/10/10	7.95	8.55	2
8/10/10	7.89	8.55	2
9/10/10	7.92	8.40	2
10/10/10	7.92	8.58	2
11/10/10	7.88	8.94	2
	10th %	8.2	
	90th %	9.0	

Attachment G

Water Quality Criteria Monitoring Data

ATTACHMENT A
DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER QUALITY CRITERIA MONITORING

CASRN#	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL[1]	REPORTING RESULTS	SAMPLE TYPE[2]	SAMPLE FREQUENCY
	METALS					
7440-36-0	Antimony, dissolved	(3)	1.4 ug/l	<1.0	G or C	1/5 YR
7440-38-2	Arsenic, dissolved	(3)	1.0 ug/l	3.0	G or C	1/5 YR
7440-43-9	Cadmium, dissolved	(3)	0.30 ug/l	<0.2	G or C	1/5 YR
16065-83-1	Chromium III, dissolved [6]	(3)	3.6 ug/l	<1.0	G or C	1/5 YR
18540-29-9	Chromium VI, dissolved [6]	(3)	1.6 ug/l	<1.0	G or C	1/5 YR
7440-50-8	Copper, dissolved	(3)	0.50 ug/l	8.1	G or C	1/5 YR
7439-92-1	Lead, dissolved	(3)	0.50 ug/l	<0.5	G or C	1/5 YR
7439-97-6	Mercury, dissolved	(3)	1.0 ug/l	<0.2	G or C	1/5 YR
7440-02-0	Nickel, dissolved	(3)	0.94 ug/l	1.2	G or C	1/5 YR
7782-49-2	Selenium, dissolved	(3)	2.0 ug/l	<1.0	G or C	1/5 YR (SW/AO)
7440-22-4	Silver, dissolved	(3)	0.20 ug/l	<0.2	G or C	1/5 YR
7440-28-0	Thallium, dissolved	(4)	(5)	<1.0	G or C	1/5 YR
7440-66-6	Zinc, dissolved	(3)	3.6 ug/l	11	G or C	1/5 YR
	PESTICIDES/PCB'S					
309-00-2	Aldrin	608	0.05	<0.05	G or C	1/5 YR
57-74-9	Chlordane	608	0.2	<0.2	G or C	1/5 YR
2921-88-2	Chlorpyrifos (synonym = Dursban)	(4)	(5)	<0.2	G or C	1/5 YR
72-54-8	DDD	608	0.1	<0.05	G or C	1/5 YR
72-55-9	DDE	608	0.1	<0.05	G or C	1/5 YR
50-29-3	DDT	608	0.1	<0.05	G or C	1/5 YR
8065-48-3	Demeton	(4)	(5)	<1	G or C	1/5 YR
333-41-5	Diazinon	(4)	(5)	<1	G or C	1/5 YR
60-57-1	Dieldrin	608	0.1	<0.05	G or C	1/5 YR
959-98-8	Alpha-Endosulfan	608	0.1	<0.05	G or C	1/5 YR
33213-65-9	Beta-Endosulfan	608	0.1	<0.05	G or C	1/5 YR
1031-07-8	Endosulfan Sulfate	608	0.1	<0.05	G or C	1/5 YR

CASRN#	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL[1]	REPORTING RESULTS	SAMPLE TYPE[2]	SAMPLE FREQUENCY
72-20-8	Endrin	608	0.1	<0.05	G or C	1/5 YR
7421-93-4	Endrin Aldehyde	(4)	(5)	<0.05	G or C	1/5 YR
86-50-0	Guthion	(4)	(5)	<1	G or C	1/5 YR
76-44-8	Heptachlor	608	0.05	<0.05	G or C	1/5 YR
1024-57-3	Heptachlor Epoxide	(4)	(5)	<0.05	G or C	1/5 YR
319-84-6	Hexachlorocyclohexane Alpha-BHC	608	(5)	<0.05	G or C	1/5 YR
319-85-7	Hexachlorocyclohexane Beta-BHC	608	(5)	<0.05	G or C	1/5 YR
58-89-9	Hexachlorocyclohexane Gamma-BHC or Lindane	608	(5)	<0.05	G or C	1/5 YR
143-50-0	Kepone	(9)	(5)	<5	G or C	1/5 YR
121-75-5	Malathion	(4)	(5)	<1	G or C	1/5 YR
72-43-5	Methoxychlor	(4)	(5)	<0.05	G or C	1/5 YR
2385-85-5	Mirex	(4)	(5)	<0.05	G or C	1/5 YR
56-38-2	Parathion	(4)	(5)	<1	G or C	1/5 YR
1336-36-3	PCB Total	608	7.0	<0.5	G or C	1/5 YR
8001-35-2	Toxaphene	608	5.0	<0.5	G or C	1/5 YR
BASE NEUTRAL EXTRACTABLES						
83-32-9	Acenaphthene	625	10.0	<5	G or C	1/5 YR
120-12-7	Anthracene	625	10.0	<5	G or C	1/5 YR
92-87-5	Benzidine	(4)	(5)	<5	G or C	1/5 YR
56-55-3	Benzo (a) anthracene	625	10.0	<5	G or C	1/5 YR
205-99-2	Benzo (b) fluoranthene	625	10.0	<5	G or C	1/5 YR
207-08-9	Benzo (k) fluoranthene	625	10.0	<5	G or C	1/5 YR
50-32-8	Benzo (a) pyrene	625	10.0	<5	G or C	1/5 YR
111-44-4	Bis 2-Chloroethyl Ether	(4)	(5)	<5	G or C	1/5 YR
108-60-1	Bis 2-Chloroisopropyl Ether	(4)	(5)	<5	G or C	1/5 YR
85-68-7	Butyl benzyl phthalate	625	10.0	<5	G or C	1/5 YR
91-58-7	2-Chloronaphthalene	(4)	(5)	<5	G or C	1/5 YR
218-01-9	Chrysene	625	10.0	<5	G or C	1/5 YR
53-70-3	Dibenz(a,h)anthracene	625	20.0	<5	G or C	1/5 YR

CASRN#	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL[1]	REPORTING RESULTS	SAMPLE TYPE[2]	SAMPLE FREQUENCY
84-74-2	Dibutyl phthalate (synonym = Di-n-Butyl Phthalate)	625	10.0	<5	G or C	1/5 YR
95-50-1	1,2-Dichlorobenzene	624	10.0	<5	G or C	1/5 YR
541-73-1	1,3-Dichlorobenzene	624	10.0	<5	G or C	1/5 YR
106-46-7	1,4-Dichlorobenzene	624	10.0	<5	G or C	1/5 YR
91-94-1	3,3-Dichlorobenzidine	(4)	(5)	<5	G or C	1/5 YR
84-66-2	Diethyl phthalate	625	10.0	<5	G or C	1/5 YR
117-81-7	Bis-2-ethylhexyl phthalate	625	10.0	<5	G or C	1/5 YR
131-11-3	Dimethyl phthalate	(4)	(5)	<5	G or C	1/5 YR
121-14-2	2,4-Dinitrotoluene	625	10.0	<5	G or C	1/5 YR
122-66-7	1,2-Diphenylhydrazine	(4)	(5)	<5	G or C	1/5 YR
206-44-0	Fluoranthene	625	10.0	<5	G or C	1/5 YR
86-73-7	Fluorene	625	10.0	<5	G or C	1/5 YR
118-74-1	Hexachlorobenzene	(4)	(5)	<5	G or C	1/5 YR
87-68-3	Hexachlorobutadiene	(4)	(5)	<5	G or C	1/5 YR
77-47-4	Hexachlorocyclopentadiene	(4)	(5)	<5	G or C	1/5 YR
67-72-1	Hexachloroethane	(4)	(5)	<5	G or C	1/5 YR
193-39-5	Indeno(1,2,3-cd)pyrene	625	20.0	<5	G or C	1/5 YR
78-59-1	Isophorone	625	10.0	<5	G or C	1/5 YR
98-95-3	Nitrobenzene	625	10.0	<5	G or C	1/5 YR
62-75-9	N-Nitrosodimethylamine	(4)	(5)	<5	G or C	1/5 YR
621-64-7	N-Nitrosodi-n-propylamine	(4)	(5)	<5	G or C	1/5 YR
86-30-6	N-Nitrosodiphenylamine	(4)	(5)	<5	G or C	1/5 YR
129-00-0	Pyrene	625	10.0	<5	G or C	1/5 YR
120-82-1	1,2,4-Trichlorobenzene	625	10.0	<5	G or C	1/5 YR
	VOLATILES					
107-02-8	Acrolein	(4)	(5)	<50	G	1/5 YR
107-13-1	Acrylonitrile	(4)	(5)	<50	G	1/5 YR
71-43-2	Benzene	624	10.0	<5	G	1/5 YR
75-25-2	Bromoform	624	10.0	<5	G	1/5 YR

CASRN#	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL[1]	REPORTING RESULTS	SAMPLE TYPE[2]	SAMPLE FREQUENCY
56-23-5	Carbon Tetrachloride	624	10.0	<5	G	1/5 YR
108-90-7	Chlorobenzene (synonym = monochlorobenzene)	624	50.0	<5	G	1/5 YR
124-48-1	Chlorodibromomethane	624	10.0	<5	G	1/5 YR
67-66-3	Chloroform	624	10.0	105	G	1/5 YR
75-09-2	Dichloromethane (synonym = methylene chloride)	624	20.0	<5	G	1/5 YR
75-27-4	Dichlorobromomethane	624	10.0	<5	G	1/5 YR
107-06-2	1,2-Dichloroethane	624	10.0	<5	G	1/5 YR
75-35-4	1,1-Dichloroethylene	624	10.0	<5	G	1/5 YR
156-60-5	1,2-trans-dichloroethylene	(4)	(5)	<5	G	1/5 YR
78-87-5	1,2-Dichloropropane	(4)	(5)	<5	G	1/5 YR
542-75-6	1,3-Dichloropropene	(4)	(5)	<5	G	1/5 YR
100-41-4	Ethylbenzene	624	10.0	<5	G	1/5 YR
74-83-9	Methyl Bromide	(4)	(5)	<10	G	1/5 YR
79-34-5	1,1,2,2-Tetrachloroethane	(4)	(5)	<5	G	1/5 YR
127-18-4	Tetrachloroethylene	624	10.0	<5	G	1/5 YR
10-88-3	Toluene	624	10.0	<5	G	1/5 YR
79-00-5	1,1,2-Trichloroethane	(4)	(5)	<5	G	1/5 YR
79-01-6	Trichloroethylene	624	10.0	<5	G	1/5 YR
75-01-4	Vinyl Chloride	624	10.0	<10	G	1/5 YR
ACID EXTRACTABLES [6]						
95-57-8	2-Chlorophenol	625	10.0	<5	G or C	1/5 YR
120-83-2	2,4 Dichlorophenol	625	10.0	<5	G or C	1/5 YR
105-67-9	2,4 Dimethylphenol	625	10.0	<5	G or C	1/5 YR
51-28-5	2,4-Dinitrophenol	(4)	(5)	<20	G or C	1/5 YR
534-52-1	2-Methyl-4,6-Dinitrophenol	(4)	(5)	<5	G or C	1/5 YR
25154-52-3	Nonylphenol	(5)	(5)	<5	G or C	1/5 YR
87-86-5	Pentachlorophenol	625	50.0	<10	G or C	1/5 YR
108-95-2	Phenol	625	10.0	<5	G or C	1/5 YR
88-06-2	2,4,6-Trichlorophenol	625	10.0	<5	G or C	1/5 YR

CASRN#	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL[1]	REPORTING RESULTS	SAMPLE TYPE[2]	SAMPLE FREQUENCY
MISCELLANEOUS						
776-41-7	Ammonia as NH3-N	350.1	200	0.12	C	1/5 YR
7782-50-5	Chlorine Produced Oxidant	(4)	(5)	See DMR	G	1/5 YR GW
7782-50-5	Chlorine, Total Residual	(4)	100	See DMR	G	1/5 YR
57-12-5	Cyanide, Free	(4)	10.0	<5	G	1/5 YR
N/A	*E. coli* / *Enterococcus* (N/CML)	(4)	(5)	<1	G	1/5 YR
7783-06-4	Hydrogen Sulfide	(5)	(5)	660	G	1/5 YR
60-10-5	Tributyltin [7]	NBSR 85-3295	(5)	<3	G or C	1/5 YR
	Hardness (mg/L as $CaCO_3$)	(4)	(5)	35	G or C (10)	1/5 YR

GORDON SLATFORD GENERAL MANAGER

Name of Principal Exec. Officer or Authorized Agent/Title

DECEMBER 20th 2010

Signature of Principal Officer or Authorized Agent/Date

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations. See 18 U.S.C. Sec. 1001 and 33 U.S.C. Sec. 1319. (Penalties under these statutes may include fines up to $10,000 and or maximum imprisonment of between 6 months and 5 years.)

FOOTNOTES:

(1) Quantification level (QL) is defined as the lowest concentration used for the calibration of a measurement system when the calibration is in accordance with the procedures published for the required method.

The quantification levels indicated for the metals are actually Specific Target Values developed for this permit. The Specific Target Value is the approximate value that may initiate a wasteload allocation analysis. Target values are not wasteload allocations or effluent limitations. The Specific Target Values are subject to change based on additional information such as hardness data, receiving stream flow, and design flows.

Units for the quantification level are micrograms/liter unless otherwise specified.

Quality control and quality assurance information shall be submitted to document that the required quantification level has been attained.

(2) Sample Type

G = Grab = An individual sample collected in less than 15 minutes. Substances specified with "grab" sample type shall only be collected as grabs. The permittee may analyze multiple grabs and report

the average results provided that the individual grab results are also reported. For grab metals samples, the individual samples shall be filtered and preserved immediately upon collection.

C = Composite = A 24-hour **(PW - Revise as required to require same composite duration as BOD_5)** composite unless otherwise specified. The composite shall be a combination of individual samples, taken proportional to flow, obtained at hourly or smaller time intervals. The individual samples may be of equal volume for flows that do not vary by +/- 10 percent over a 24-hour period.

(3) A specific analytical method is not specified; however a target value for each metal has been established. An appropriate method to meet the target value shall be selected from the following list of EPA methods (or any approved method presented in 40 CFR Part 136). If the test result is less than the method QL, a "<[QL]" shall be reported where the actual analytical test QL is substituted for [QL].

Metal	Analytical Method
Antimony	1638; 1639
Arsenic	206.5; 1632
Chromium[8]	1639
Cadmium	1637; 1638; 1639; 1640
Chromium VI	218.6; 1639
Copper	1638; 1640
Lead	1637; 1638; 1640
Mercury	245.7; 1631
Nickel	1638; 1639; 1640
Selenium	1638; 1639
Silver	1638
Zinc	1638; 1639

(4) Any approved method presented in 40 CFR Part 136.

(5) The QL is at the discretion of the permittee. For any substances addressed in 40 CFR Part 136, the permittee shall use one of the approved methods in 40 CFR Part 136.

(6) Testing for phenols requires continuous extraction.

(7) Analytical Methods: NBSR 85-3295 or DEQ's approved analysis for Tributyltin may also be used [See A Manual for the Analysis of Butyltins in Environmental Systems by the Virginia Institute of Marine Science, dated November 1996].

(8) Both Chromium III and Chromium VI may be measured by the total chromium analysis. If the result of the total chromium analysis is less than or equal to the lesser of the Chromium III or Chromium VI method QL, the results for both Chromium III and Chromium VI can be reported as "<[QL]", where the actual analytical test QL is substituted for [QL].

(9) The lab may use SW846 Method 8270D provided the lab has an Initial Demonstration of Capability, has passed a PT for Kepone, and meets the acceptance criteria for Kepone as given in Method 8270D

(10) The sample type for Hardness (as $CaCO_3$) shall match the sample type selected for Dissolved Metals.

Attachment H

MSTRANTI & STATS Analyses

MSTRANTI DATA SOURCE REPORT

VA0029343 – The Tides Utilities, LLC North WWTP

Stream Information	
Mean Hardness	Not applicable to saltwater discharges
90% Temperature (annual)	Calculated from data collected from monitoring station 3-CTR000.76
90% Temperature (winter)	Not applicable, a winter effluent tier has not been included in the permit
90% Maximum pH	Calculated from data collected from monitoring station 3-CTR000.76
10% Maximum pH	
Tier Designation	Flow Frequency Analysis
Tidal Zone	
Mean Salinity	Calculated from data collected from monitoring station 3-CTR000.76
Mixing Information	
Design Flow	Permit application, EPA Form 2A
Wasteload Allocation Multipliers	Stream Sanitation Analysis
Effluent Information	
Mean Hardness	Not applicable to saltwater discharges
90% Temperature (annual)	Best Engineering Judgment, 28°C (1)
90% Temperature (winter)	Not applicable, a winter effluent tier has not been included in the permit
90% Maximum pH	Calculated from data provided on monthly discharge monitoring reports.
10% Maximum pH	
Discharge Flow	Permit application, EPA Form 2A

(1) During the 2005 permit reissuance the permittee reported a maximum daily summer temperature of 29.3°C on EPA Form 2A. The permittee reported a maximum daily summer temperature of 24.2°C on EPA Form 2A for the 2011 permit reissuance. Due to the disparity between these reported temperatures (especially since the effluent resides in a polishing pond for an extended period of time and no operational changes have occurred) an assumed 90th percentile effluent temperature of 28°C was utilized for wasteload allocation development based upon best engineering judgment.

SALTWATER AND TRANSITION ZONES
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: The Tides Utilities, LLC North WWTP Permit No.: VA0029343 Version: OWP Guidance Memo 00-2011 (8/24/00)
Receiving Stream: Church Prong, UT

Stream Information		
Mean Hardness (as CaCO3) =	NA	mg/l
90th % Temperature (Annual) =	27.4	(° C)
90th % Temperature (Winter) =	NA	(° C)
90th % Maximum pH =	8	
10th % Maximum pH =	7.5	
Tier Designation (1 or 2) =	1	
Early Life Stages Present Y/N =	Y	
Tidal Zone =	1	(1 = saltwater, 2 = transition zone)
Mean Salinity =	15.1	(g/kg)

Mixing Information	
Design Flow (MGD)	0.0325
Acute WLA multiplier	16
Chronic WLA multiplier	16
Human health WLA multiplier	16

Effluent Information		
Mean Hardness (as CaCO3) =	NA	mg/L
90 % Temperature (Annual) =	28	(° C)
90 % Temperature (Winter) =	NA	(° C)
90 % Maximum pH =	9	SU
10 % Maximum pH =	8.2	SU
Discharge Flow =	0.0325	MGD

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			**Most Limiting Allocations**		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	**Acute**	**Chronic**	**HH**
Acenapthene	0	--	--	9.9E+02	--	--	1.6E+04	--	--	--	--	--	--	**--**	**--**	**1.6E+04**
Acrolein	0	--	--	9.3E+00	--	--	1.5E+02	--	--	--	--	--	--	**--**	**--**	**1.5E+02**
Acrylonitrile[C]	0	--	--	2.5E+00	--	--	4.0E+01	--	--	--	--	--	--	**--**	**--**	**4.0E+01**
Aldrin [C]	0	1.3E+00	--	5.0E-04	2.1E+01	--	8.0E-03	--	--	--	--	--	--	**2.1E+01**	**--**	**8.0E-03**
Ammonia-N (mg/l) - Annual	0	#######	4.65E-01	--	4.95E+01	7.43E+00	--	--	--	--	--	--	--	**4.95E+01**	**7.43E+00**	**--**
Ammonia-N (mg/l) - Winter	0	#VALUE!	#VALUE!	--	#VALUE!	#VALUE!	--	--	--	--	--	--	--	**#VALUE!**	**#VALUE!**	**--**
Anthracene	0	--	--	4.0E+04	--	--	6.4E+05	--	--	--	--	--	--	**--**	**--**	**6.4E+05**
Antimony	0	--	--	6.4E+02	--	--	1.0E+04	--	--	--	--	--	--	**--**	**--**	**1.0E+04**
Arsenic	0	6.9E+01	3.6E+01	--	1.1E+03	5.8E+02	--	--	--	--	--	--	--	**1.1E+03**	**5.8E+02**	**--**
Benzene [C]	0	--	--	5.1E+02	--	--	8.2E+03	--	--	--	--	--	--	**--**	**--**	**8.2E+03**
Benzidine[C]	0	--	--	2.0E-03	--	--	3.2E-02	--	--	--	--	--	--	**--**	**--**	**3.2E-02**
Benzo (a) anthracene [C]	0	--	--	1.8E-01	--	--	2.9E+00	--	--	--	--	--	--	**--**	**--**	**2.9E+00**
Benzo (b) fluoranthene [C]	0	--	--	1.8E-01	--	--	2.9E+00	--	--	--	--	--	--	**--**	**--**	**2.9E+00**
Benzo (k) fluoranthene [C]	0	--	--	1.8E-01	--	--	2.9E+00	--	--	--	--	--	--	**--**	**--**	**2.9E+00**
Benzo (a) pyrene [C]	0	--	--	1.8E-01	--	--	2.9E+00	--	--	--	--	--	--	**--**	**--**	**2.9E+00**
Bis2-Chloroethyl Ether[C]	0	--	--	5.3E+00	--	--	8.5E+01	--	--	--	--	--	--	**--**	**--**	**8.5E+01**
Bis2-Chloroisopropyl Ether	0	--	--	6.5E+04	--	--	1.0E+06	--	--	--	--	--	--	**--**	**--**	**1.0E+06**
Bis2-Ethylhexyl Phthalate[C]	0	--	--	2.2E+01	--	--	3.5E+02	--	--	--	--	--	--	**--**	**--**	**3.5E+02**
Bromoform [C]	0	--	--	1.4E+03	--	--	2.2E+04	--	--	--	--	--	--	**--**	**--**	**2.2E+04**
Butylbenzylphthalate	0	--	--	1.9E+03	--	--	3.0E+04	--	--	--	--	--	--	**--**	**--**	**3.0E+04**
Cadmium	0	4.0E+01	8.8E+00	--	6.4E+02	1.4E+02	--	--	--	--	--	--	--	**6.4E+02**	**1.4E+02**	**--**
Carbon Tetrachloride [C]	0	--	--	1.6E+01	--	--	2.6E+02	--	--	--	--	--	--	**--**	**--**	**2.6E+02**
Chlordane [C]	0	9.0E-02	4.0E-03	8.1E-03	1.4E+00	6.4E-02	1.3E-01	--	--	--	--	--	--	**1.4E+00**	**6.4E-02**	**1.3E-01**

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			**Most Limiting Allocations**		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	**Acute**	**Chronic**	**HH**
TRC	0			--			--	--	--	--	--	--	--	**--**	**--**	**--**
Chlorine Prod. Oxidant	0	1.3E+01	7.5E+00	--	2.1E+02	1.2E+02	--	--	--	--	--	--	--	**2.1E+02**	**1.2E+02**	**--**
Chlorobenzene	0	--	--	1.6E+03	--	--	2.6E+04	--	--	--	--	--	--	**--**	**--**	**2.6E+04**
Chlorodibromomethane[C]	0	--	--	1.3E+02	--	--	2.1E+03	--	--	--	--	--	--	**--**	**--**	**2.1E+03**
Chloroform	0	--	--	1.1E+04	--	--	1.8E+05	--	--	--	--	--	--	**--**	**--**	**1.8E+05**
2-Chloronaphthalene	0	--	--	1.6E+03	--	--	2.6E+04	--	--	--	--	--	--	**--**	**--**	**2.6E+04**
2-Chlorophenol	0	--	--	1.5E+02	--	--	2.4E+03	--	--	--	--	--	--	**--**	**--**	**2.4E+03**
Chlorpyrifos	0	1.1E-02	5.6E-03	--	1.8E-01	9.0E-02	--	--	--	--	--	--	--	**1.8E-01**	**9.0E-02**	**--**
Chromium III	0			--			--	--	--	--	--	--	--	**--**	**--**	**--**
Chromium VI	0	1.1E+03	5.0E+01	--	1.8E+04	8.0E+02	--	--	--	--	--	--	--	**1.8E+04**	**8.0E+02**	**--**
Chrysene [C]	0	--	--	1.8E-02	--	--	2.9E-01	--	--	--	--	--	--	**--**	**--**	**2.9E-01**
Copper	0	9.3E+00	6.0E+00	--	1.5E+02	9.6E+01	--	--	--	--	--	--	--	**1.5E+02**	**9.6E+01**	**--**
Cyanide, Free	0	1.0E+00	1.0E+00	1.6E+04	1.6E+01	1.6E+01	2.6E+05	--	--	--	--	--	--	**1.6E+01**	**1.6E+01**	**2.6E+05**
DDD [C]	0	--	--	3.1E-03	--	--	5.0E-02	--	--	--	--	--	--	**--**	**--**	**5.0E-02**
DDE [C]	0	--	--	2.2E-03	--	--	3.5E-02	--	--	--	--	--	--	**--**	**--**	**3.5E-02**
DDT [C]	0	1.3E-01	1.0E-03	2.2E-03	2.1E+00	1.6E-02	3.5E-02	--	--	--	--	--	--	**2.1E+00**	**1.6E-02**	**3.5E-02**
Demeton	0	--	1.0E-01	--	--	1.6E+00	--	--	--	--	--	--	--	**--**	**1.6E+00**	**--**
Diazinon	0	8.2E-01	8.2E-01	--	1.3E+01	1.3E+01	--	--	--	--	--	--	--	**1.3E+01**	**1.3E+01**	**--**
Dibenz(a,h)anthracene [C]	0	--	--	1.8E-01	--	--	2.9E+00	--	--	--	--	--	--	**--**	**--**	**2.9E+00**
1,2-Dichlorobenzene	0	--	--	1.3E+03	--	--	2.1E+04	--	--	--	--	--	--	**--**	**--**	**2.1E+04**
1,3-Dichlorobenzene	0	--	--	9.6E+02	--	--	1.5E+04	--	--	--	--	--	--	**--**	**--**	**1.5E+04**
1,4-Dichlorobenzene	0	--	--	1.9E+02	--	--	3.0E+03	--	--	--	--	--	--	**--**	**--**	**3.0E+03**
3,3-Dichlorobenzidine[C]	0	--	--	2.8E-01	--	--	4.5E+00	--	--	--	--	--	--	**--**	**--**	**4.5E+00**
Dichlorobromomethane [C]	0	--	--	1.7E+02	--	--	2.7E+03	--	--	--	--	--	--	**--**	**--**	**2.7E+03**
1,2-Dichloroethane [C]	0	--	--	3.7E+02	--	--	5.9E+03	--	--	--	--	--	--	**--**	**--**	**5.9E+03**
1,1-Dichloroethylene	0	--	--	7.1E+03	--	--	1.1E+05	--	--	--	--	--	--	**--**	**--**	**1.1E+05**
1,2-trans-dichloroethylene	0	--	--	1.0E+04	--	--	1.6E+05	--	--	--	--	--	--	**--**	**--**	**1.6E+05**
2,4-Dichlorophenol	0	--	--	2.9E+02	--	--	4.6E+03	--	--	--	--	--	--	**--**	**--**	**4.6E+03**
1,2-Dichloropropane[C]	0	--	--	1.5E+02	--	--	2.4E+03	--	--	--	--	--	--	**--**	**--**	**2.4E+03**
1,3-Dichloropropene[C]	0	--	--	2.1E+02	--	--	3.4E+03	--	--	--	--	--	--	**--**	**--**	**3.4E+03**
Dieldrin [C]	0	7.1E-01	1.9E-03	5.4E-04	1.1E+01	3.0E-02	8.6E-03	--	--	--	--	--	--	**1.1E+01**	**3.0E-02**	**8.6E-03**
Diethyl Phthalate	0	--	--	4.4E+04	--	--	7.0E+05	--	--	--	--	--	--	**--**	**--**	**7.0E+05**
2,4-Dimethylphenol	0	--	--	8.5E+02	--	--	1.4E+04	--	--	--	--	--	--	**--**	**--**	**1.4E+04**
Dimethyl Phthalate	0	--	--	1.1E+06	--	--	1.8E+07	--	--	--	--	--	--	**--**	**--**	**1.8E+07**
Di-n-Butyl Phthalate	0	--	--	4.5E+03	--	--	7.2E+04	--	--	--	--	--	--	**--**	**--**	**7.2E+04**
2,4 Dinitrophenol	0	--	--	5.3E+03	--	--	8.5E+04	--	--	--	--	--	--	**--**	**--**	**8.5E+04**
2-Methyl-4,6-Dinitrophenol	0	--	--	2.8E+02	--	--	4.5E+03	--	--	--	--	--	--	**--**	**--**	**4.5E+03**
2,4-Dinitrotoluene [C]	0	--	--	3.4E+01	--	--	5.4E+02	--	--	--	--	--	--	**--**	**--**	**5.4E+02**
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	5.1E-08	--	--	8.2E-07	--	--	--	--	--	--	**--**	**--**	**8.2E-07**
1,2-Diphenylhydrazine[C]	0	--	--	2.0E+00	--	--	3.2E+01	--	--	--	--	--	--	**--**	**--**	**3.2E+01**
Alpha-Endosulfan	0	3.4E-02	8.7E-03	8.9E+01	5.4E-01	1.4E-01	1.4E+03	--	--	--	--	--	--	**5.4E-01**	**1.4E-01**	**1.4E+03**

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			**Most Limiting Allocations**		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	**Acute**	**Chronic**	**HH**
Beta-Endosulfan	0	3.4E-02	8.7E-03	8.9E+01	5.4E-01	1.4E-01	1.4E+03	--	--	--	--	--	--	**5.4E-01**	**1.4E-01**	**1.4E+03**
Alpha + Beta Endosulfan	0	3.4E-02	8.7E-03	--	5.4E-01	1.4E-01	--	--	--	--	--	--	--	**5.4E-01**	**1.4E-01**	**--**
Endosulfan Sulfate	0	--	--	8.9E+01	--	--	1.4E+03	--	--	--	--	--	--	**--**	**--**	**1.4E+03**
Endrin	0	3.7E-02	2.3E-03	6.0E-02	5.9E-01	3.7E-02	9.6E-01	--	--	--	--	--	--	**5.9E-01**	**3.7E-02**	**9.6E-01**
Endrin Aldehyde	0	--	--	3.0E-01	--	--	4.8E+00	--	--	--	--	--	--	**--**	**--**	**4.8E+00**
Ethylbenzene	0	--	--	2.1E+03	--	--	3.4E+04	--	--	--	--	--	--	**--**	**--**	**3.4E+04**
Fluoranthene	0	--	--	1.4E+02	--	--	2.2E+03	--	--	--	--	--	--	**--**	**--**	**2.2E+03**
Fluorene	0	--	--	5.3E+03	--	--	8.5E+04	--	--	--	--	--	--	**--**	**--**	**8.5E+04**
Guthion	0	--	1.0E-02	--	--	1.6E-01	--	--	--	--	--	--	--	**--**	**1.6E-01**	**--**
Heptachlor [C]	0	5.3E-02	3.6E-03	7.9E-04	8.5E-01	5.8E-02	1.3E-02	--	--	--	--	--	--	**8.5E-01**	**5.8E-02**	**1.3E-02**
Heptachlor Epoxide[C]	0	5.3E-02	3.6E-03	3.9E-04	8.5E-01	5.8E-02	6.2E-03	--	--	--	--	--	--	**8.5E-01**	**5.8E-02**	**6.2E-03**
Hexachlorobenzene[C]	0	--	--	2.9E-03	--	--	4.6E-02	--	--	--	--	--	--	**--**	**--**	**4.6E-02**
Hexachlorobutadiene[C]	0	--	--	1.8E+02	--	--	2.9E+03	--	--	--	--	--	--	**--**	**--**	**2.9E+03**
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	4.9E-02	--	--	7.8E-01	--	--	--	--	--	--	**--**	**--**	**7.8E-01**
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	1.7E-01	--	--	2.7E+00	--	--	--	--	--	--	**--**	**--**	**2.7E+00**
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	1.6E-01	--	1.8E+00	2.6E+00	--	2.9E+01	--	--	--	--	--	--	**2.6E+00**	**--**	**2.9E+01**
Hexachlorocyclopentadiene	0	--	--	1.1E+03	--	--	1.8E+04	--	--	--	--	--	--	**--**	**--**	**1.8E+04**
Hexachloroethane[C]	0	--	--	3.3E+01	--	--	5.3E+02	--	--	--	--	--	--	**--**	**--**	**5.3E+02**
Hydrogen Sulfide	0	--	2.0E+00	--	--	3.2E+01	--	--	--	--	--	--	--	**--**	**3.2E+01**	**--**
Indeno (1,2,3-cd) pyrene C	0	--	--	1.8E-01	--	--	2.9E+00	--	--	--	--	--	--	**--**	**--**	**2.9E+00**
Isophorone[C]	0	--	--	9.6E+03	--	--	1.5E+05	--	--	--	--	--	--	**--**	**--**	**1.5E+05**
Kepone	0	--	0.0E+00	--	--	0.0E+00	--	--	--	--	--	--	--	**--**	**0.0E+00**	**--**
Lead	0	2.4E+02	9.3E+00	--	3.8E+03	1.5E+02	--	--	--	--	--	--	--	**3.8E+03**	**1.5E+02**	**--**
Malathion	0	--	1.0E-01	--	--	1.6E+00	--	--	--	--	--	--	--	**--**	**1.6E+00**	**--**
Mercury	0	1.8E+00	9.4E-01	--	2.9E+01	1.5E+01	--	--	--	--	--	--	--	**2.9E+01**	**1.5E+01**	**--**
Methyl Bromide	0	--	--	1.5E+03	--	--	2.4E+04	--	--	--	--	--	--	**--**	**--**	**2.4E+04**
Methylene Chloride [C]	0	--	--	5.9E+03	--	--	9.4E+04	--	--	--	--	--	--	**--**	**--**	**9.4E+04**
Methoxychlor	0	--	3.0E-02	--	--	4.8E-01	--	--	--	--	--	--	--	**--**	**4.8E-01**	**--**
Mirex	0	--	0.0E+00	--	--	0.0E+00	--	--	--	--	--	--	--	**--**	**0.0E+00**	**--**
Nickel	0	7.4E+01	8.2E+00	4.6E+03	1.2E+03	1.3E+02	7.4E+04	--	--	--	--	--	--	**1.2E+03**	**1.3E+02**	**7.4E+04**
Nitrobenzene	0	--	--	6.9E+02	--	--	1.1E+04	--	--	--	--	--	--	**--**	**--**	**1.1E+04**
N-Nitrosodimethylamine[C]	0	--	--	3.0E+01	--	--	4.8E+02	--	--	--	--	--	--	**--**	**--**	**4.8E+02**
N-Nitrosodiphenylamine[C]	0	--	--	6.0E+01	--	--	9.6E+02	--	--	--	--	--	--	**--**	**--**	**9.6E+02**
N-Nitrosodi-n-propylamine[C]	0	--	--	5.1E+00	--	--	8.2E+01	--	--	--	--	--	--	**--**	**--**	**8.2E+01**
Nonylphenol	0	7.0E+00	1.7E+00	--	1.1E+02	2.7E+01	--	--	--	--	--	--	--	**1.1E+02**	**2.7E+01**	**--**
Parathion	0	--	--	--	--	--	--	--	--	--	--	--	--	**--**	**--**	**--**
PCB Total[C]	0	--	3.0E-02	6.4E-04	--	4.8E-01	1.0E-02	--	--	--	--	--	--	**--**	**4.8E-01**	**1.0E-02**
Pentachlorophenol [C]	0	1.3E+01	7.9E+00	3.0E+01	2.1E+02	1.3E+02	4.8E+02	--	--	--	--	--	--	**2.1E+02**	**1.3E+02**	**4.8E+02**

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			**Most Limiting Allocations**		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	**Acute**	**Chronic**	**HH**
Phenol	0	--	--	8.6E+05	--	--	1.4E+07	--	--	--	--	--	--	**--**	**--**	**1.4E+07**
Phosphorus (Elemental)	0	--	1.0E-01	--	--	1.6E+00	--	--	--	--	--	--	--	**--**	**1.6E+00**	**--**
Pyrene	0	--	--	4.0E+03	--	--	6.4E+04	--	--	--	--	--	--	**--**	**--**	**6.4E+04**
Radionuclides	0	--	--	--	--	--	--	--	--	--	--	--	--	**--**	**--**	**--**
Beta and Photon Activity (mrem/yr)	0	--	--	4.0E+00	--	--	6.4E+01	--	--	--	--	--	--	**--**	**--**	**6.4E+01**
Selenium	0	2.9E+02	7.1E+01	4.2E+03	4.6E+03	1.1E+03	6.7E+04	--	--	--	--	--	--	**4.6E+03**	**1.1E+03**	**6.7E+04**
Silver	0	1.9E+00	--	--	3.0E+01	--	--	--	--	--	--	--	--	**3.0E+01**	**--**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	4.0E+01	--	--	6.4E+02	--	--	--	--	--	--	**--**	**--**	**6.4E+02**
Tetrachloroethylene[C]	0	--	--	3.3E+01	--	--	5.3E+02	--	--	--	--	--	--	**--**	**--**	**5.3E+02**
Thallium	0	--	--	4.7E-01	--	--	7.5E+00	--	--	--	--	--	--	**--**	**--**	**7.5E+00**
Toluene	0	--	--	6.0E+03	--	--	9.6E+04	--	--	--	--	--	--	**--**	**--**	**9.6E+04**
Toxaphene [C]	0	2.1E-01	2.0E-04	2.8E-03	3.4E+00	3.2E-03	4.5E-02	--	--	--	--	--	--	**3.4E+00**	**3.2E-03**	**4.5E-02**
Tributyltin	0	4.2E-01	7.4E-03	--	6.7E+00	1.2E-01	--	--	--	--	--	--	--	**6.7E+00**	**1.2E-01**	**--**
1,2,4-Trichlorobenzene	0	--	--	7.0E+01	--	--	1.1E+03	--	--	--	--	--	--	**--**	**--**	**1.1E+03**
1,1,2-Trichloroethane[C]	0	--	--	1.6E+02	--	--	2.6E+03	--	--	--	--	--	--	**--**	**--**	**2.6E+03**
Trichloroethylene [C]	0	--	--	3.0E+02	--	--	4.8E+03	--	--	--	--	--	--	**--**	**--**	**4.8E+03**
2,4,6-Trichlorophenol [C]	0	--	--	2.4E+01	--	--	3.8E+02	--	--	--	--	--	--	**--**	**--**	**3.8E+02**
Vinyl Chloride[C]	0	--	--	2.4E+01	--	--	3.8E+02	--	--	--	--	--	--	**--**	**--**	**3.8E+02**
Zinc	0	9.0E+01	8.1E+01	2.6E+04	1.4E+03	1.3E+03	4.2E+05	--	--	--	--	--	--	**1.4E+03**	**1.3E+03**	**4.2E+05**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. For transition zone waters, spreadsheet prints the lesser of the freshwater and saltwater water quality criteria.
6. Regular WLA = (WQC x WLA multiplier) - (WLA multiplier - 1)(background conc.)
7. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
8. Antideg. WLA = (Antideg. Baseline)(WLA multiplier) - (WLA multiplier - 1)(background conc.)

Metal	Site Specific Target Value (SSTV)
Antimony	1.0E+04
Arsenic III	3.5E+02
Cadmium	8.4E+01
Chromium III	#VALUE!
Chromium VI	4.8E+02
Copper	5.8E+01
Lead	8.9E+01
Mercury	9.0E+00
Nickel	7.9E+01
Selenium	6.8E+02
Silver	1.2E+01
Zinc	5.8E+02

Note: do not use QL's lower than the minimum QL's provided in agency guidance

10/25/2011 10:03:22 AM

Facility = The Tides Utilities, LLC North WWTP - 0.0325 Facility
Chemical = Ammonia as Nitrogen
Chronic averaging period = 30
WLAa = 49.5 mg/L
WLAc = 7.43 mg/L
Q.L. = 0.20 mg/L
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 14.9912887940832 mg/L
Average Weekly limit = 14.9912887940832 mg/L
Average Monthly LImit = 14.9912887940832 mg/L

The data are:

9.0 mg/L

In accordance with GM 00-2011, the acute and chronic wasteload allocations from MSTRANTI were entered into STATS along with one datum of 9.0 mg/L in order to force a limit. The Ammonia (as N) limits above are less stringent than those contained in the 2005 permit. As a result, the 2005 permit limits have been carried forward in order to avoid backsliding.

10/25/2011 10:04:27 AM

Facility = The Tides Utilities, LLC North WWTP - 0.0325 Facility
Chemical = Dissolved Arsenic
Chronic averaging period = 4
WLAa = 1100 ug/L
WLAc = 580 ug/L
Q.L. = 0.1 ug/L
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 3
Variance = 3.24
C.V. = 0.6
97th percentile daily values = 7.30025
97th percentile 4 day average = 4.99137
97th percentile 30 day average= 3.61815
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

3 ug/L

10/25/2011 10:05:26 AM

Facility = The Tides Utilities, LLC North WWTP - 0.0325 Facility
Chemical = Dissolved Copper
Chronic averaging period = 4
WLAa = 150 ug/L
WLAc = 96 ug/L
Q.L. = 0.1 ug/L
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 8.1
Variance = 23.6196
C.V. = 0.6
97th percentile daily values = 19.7106
97th percentile 4 day average = 13.4767
97th percentile 30 day average= 9.76903
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

8.1 ug/L

10/25/2011 10:07:00 AM

Facility = The Tides Utilities, LLC North WWTP - 0.0325 Facility
Chemical = Chlorine Produced Oxidant -> Effluent TRC Limits
Chronic averaging period = 4
WLAa = 210 ug/L
WLAc = 120 ug/L
Q.L. = 0.1 ug/L
# samples/mo. = 30
# samples/wk. = 7

Summary of Statistics:

observations = 1
Expected Value = 20000
Variance = 1440000
C.V. = 0.6
97th percentile daily values = 48668.3
97th percentile 4 day average = 33275.8
97th percentile 30 day average= 24121.0
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 175.508974086388
Average Weekly limit = 107.184595324212
Average Monthly LImit = 86.9859620059178

The data are:

20000 ug/L

In accordance with GM 00-2011, the acute and chronic wasteload allocations from MSTRANTI were entered into STATS along with one datum of 20000 ug/L (20 mg/L) in order to force a limit. The CPO limits above are less stringent than those contained in the 2005 permit. As a result, the 2005 permit limits have been carried forward in order to avoid backsliding.

As indicated in GM 10-2003, the CPO in-stream saltwater limits are met by applying Total Residual Chlorine (TRC) limits to the facility's effluent.

10/25/2011 10:09:01 AM

Facility = The Tides Utilities, LLC North WWTP - 0.0325 Facility
Chemical = Dissolved Nickel
Chronic averaging period = 4
WLAa = 1200 ug/L
WLAc = 130 ug/L
Q.L. = 0.1 ug/L
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 1.2
Variance = .5184
C.V. = 0.6
97th percentile daily values = 2.92010
97th percentile 4 day average = 1.99654
97th percentile 30 day average= 1.44726
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

1.2 ug/L

10/25/2011 10:10:03 AM

Facility = The Tides Utilities, LLC North WWTP - 0.0325 Facility
Chemical = Dissolved Zinc
Chronic averaging period = 4
WLAa = 1400 ug/L
WLAc = 1300 ug/L
Q.L. = 0.1 ug/L
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 11
Variance = 43.56
C.V. = 0.6
97th percentile daily values = 26.7675
97th percentile 4 day average = 18.3016
97th percentile 30 day average= 13.2665
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

11 ug/L

SALTWATER AND TRANSITION ZONES
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: The Tides Utilities, LLC North WWTP Permit No.: VA0029343 Version: OWP Guidance Memo 00-2011 (8/24/00)
Receiving Stream: Church Prong, UT

Stream Information		
Mean Hardness (as CaCO3) =	NA	mg/l
90th % Temperature (Annual) =	27.4	(° C)
90th % Temperature (Winter) =	NA	(° C)
90th % Maximum pH =	8	
10th % Maximum pH =	7.5	
Tier Designation (1 or 2) =	2	
Early Life Stages Present Y/N =	Y	
Tidal Zone =	1	(1 = saltwater, 2 = transition zone)
Mean Salinity =	15.1	(g/kg)

Mixing Information	
Design Flow (MGD)	0.1
Acute WLA multiplier	1
Chronic WLA multiplier	1
Human health WLA multiplier	1

Effluent Information		
Mean Hardness (as CaCO3) =	NA	mg/L
90 % Temperature (Annual) =	28	(° C)
90 % Temperature (Winter) =	NA	(° C)
90 % Maximum pH =	9	SU
10 % Maximum pH =	8.2	SU
Discharge Flow =	0.1	MGD

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			**Most Limiting Allocations**		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	**Acute**	**Chronic**	**HH**
Acenapthene	0	--	--	9.9E+02	--	--	9.9E+02	--	--	9.9E+01	--	--	9.9E+01	**--**	**--**	**9.9E+01**
Acrolein	0	--	--	9.3E+00	--	--	9.3E+00	--	--	9.3E-01	--	--	9.3E-01	**--**	**--**	**9.3E-01**
Acrylonitrile[C]	0	--	--	2.5E+00	--	--	2.5E+00	--	--	2.5E-01	--	--	2.5E-01	**--**	**--**	**2.5E-01**
Aldrin [C]	0	1.3E+00	--	5.0E-04	1.3E+00	--	5.0E-04	3.3E-01	--	5.0E-05	3.3E-01	--	5.0E-05	**3.3E-01**	**--**	**5.0E-05**
Ammonia-N (mg/l) - Annual	0	4.61E-01	6.92E-02	--	4.61E-01	6.92E-02	--	1.15E-01	1.73E-02	--	1.15E-01	1.73E-02	--	**1.15E-01**	**1.73E-02**	**--**
Ammonia-N (mg/l) - Winter	0	#VALUE!	#VALUE!	--	#VALUE!	#VALUE!	--	#VALUE!	#VALUE!	--	#VALUE!	#VALUE!	--	**#VALUE!**	**#VALUE!**	**--**
Anthracene	0	--	--	4.0E+04	--	--	4.0E+04	--	--	4.0E+03	--	--	4.0E+03	**--**	**--**	**4.0E+03**
Antimony	0	--	--	6.4E+02	--	--	6.4E+02	--	--	6.4E+01	--	--	6.4E+01	**--**	**--**	**6.4E+01**
Arsenic	0	6.9E+01	3.6E+01	--	6.9E+01	3.6E+01	--	1.7E+01	9.0E+00	--	1.7E+01	9.0E+00	--	**1.7E+01**	**9.0E+00**	**--**
Benzene [C]	0	--	--	5.1E+02	--	--	5.1E+02	--	--	5.1E+01	--	--	5.1E+01	**--**	**--**	**5.1E+01**
Benzidine[C]	0	--	--	2.0E-03	--	--	2.0E-03	--	--	2.0E-04	--	--	2.0E-04	**--**	**--**	**2.0E-04**
Benzo (a) anthracene [C]	0	--	--	1.8E-01	--	--	1.8E-01	--	--	1.8E-02	--	--	1.8E-02	**--**	**--**	**1.8E-02**
Benzo (b) fluoranthene [C]	0	--	--	1.8E-01	--	--	1.8E-01	--	--	1.8E-02	--	--	1.8E-02	**--**	**--**	**1.8E-02**
Benzo (k) fluoranthene [C]	0	--	--	1.8E-01	--	--	1.8E-01	--	--	1.8E-02	--	--	1.8E-02	**--**	**--**	**1.8E-02**
Benzo (a) pyrene [C]	0	--	--	1.8E-01	--	--	1.8E-01	--	--	1.8E-02	--	--	1.8E-02	**--**	**--**	**1.8E-02**
Bis2-Chloroethyl Ether[C]	0	--	--	5.3E+00	--	--	5.3E+00	--	--	5.3E-01	--	--	5.3E-01	**--**	**--**	**5.3E-01**
Bis2-Chloroisopropyl Ether	0	--	--	6.5E+04	--	--	6.5E+04	--	--	6.5E+03	--	--	6.5E+03	**--**	**--**	**6.5E+03**
Bis2-Ethylhexyl Phthalate[C]	0	--	--	2.2E+01	--	--	2.2E+01	--	--	2.2E+00	--	--	2.2E+00	**--**	**--**	**2.2E+00**
Bromoform [C]	0	--	--	1.4E+03	--	--	1.4E+03	--	--	1.4E+02	--	--	1.4E+02	**--**	**--**	**1.4E+02**
Butylbenzylphthalate	0	--	--	1.9E+03	--	--	1.9E+03	--	--	1.9E+02	--	--	1.9E+02	**--**	**--**	**1.9E+02**
Cadmium	0	4.0E+01	8.8E+00	--	4.0E+01	8.8E+00	--	1.0E+01	2.2E+00	--	1.0E+01	2.2E+00	--	**1.0E+01**	**2.2E+00**	**--**
Carbon Tetrachloride [C]	0	--	--	1.6E+01	--	--	1.6E+01	--	--	1.6E+00	--	--	1.6E+00	**--**	**--**	**1.6E+00**
Chlordane [C]	0	9.0E-02	4.0E-03	8.1E-03	9.0E-02	4.0E-03	8.1E-03	2.3E-02	1.0E-03	8.1E-04	2.3E-02	1.0E-03	8.1E-04	**2.3E-02**	**1.0E-03**	**8.1E-04**

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			**Most Limiting Allocations**		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	**Acute**	**Chronic**	**HH**
TRC	0			--			--	--	--	--	--	--	--	**--**	**--**	**--**
Chlorine Prod. Oxidant	0	1.3E+01	7.5E+00	--	1.3E+01	7.5E+00	--	3.3E+00	1.9E+00	--	3.3E+00	1.9E+00	--	**3.3E+00**	**1.9E+00**	**--**
Chlorobenzene	0	--	--	1.6E+03	--	--	1.6E+03	--	--	1.6E+02	--	--	1.6E+02	**--**	**--**	**1.6E+02**
Chlorodibromomethane[C]	0	--	--	1.3E+02	--	--	1.3E+02	--	--	1.3E+01	--	--	1.3E+01	**--**	**--**	**1.3E+01**
Chloroform	0	--	--	1.1E+04	--	--	1.1E+04	--	--	1.1E+03	--	--	1.1E+03	**--**	**--**	**1.1E+03**
2-Chloronaphthalene	0	--	--	1.6E+03	--	--	1.6E+03	--	--	1.6E+02	--	--	1.6E+02	**--**	**--**	**1.6E+02**
2-Chlorophenol	0	--	--	1.5E+02	--	--	1.5E+02	--	--	1.5E+01	--	--	1.5E+01	**--**	**--**	**1.5E+01**
Chlorpyrifos	0	1.1E-02	5.6E-03	--	1.1E-02	5.6E-03	--	2.8E-03	1.4E-03	--	2.8E-03	1.4E-03	--	**2.8E-03**	**1.4E-03**	**--**
Chromium III	0			--			--	--	--	--	--	--	--	**--**	**--**	**--**
Chromium VI	0	1.1E+03	5.0E+01	--	1.1E+03	5.0E+01	--	2.8E+02	1.3E+01	--	2.8E+02	1.3E+01	--	**2.8E+02**	**1.3E+01**	**--**
Chrysene [C]	0	--	--	1.8E-02	--	--	1.8E-02	--	--	1.8E-03	--	--	1.8E-03	**--**	**--**	**1.8E-03**
Copper	0	9.3E+00	6.0E+00	--	9.3E+00	6.0E+00	--	2.3E+00	1.5E+00	--	2.3E+00	1.5E+00	--	**2.3E+00**	**1.5E+00**	**--**
Cyanide, Free	0	1.0E+00	1.0E+00	1.6E+04	1.0E+00	1.0E+00	1.6E+04	2.5E-01	2.5E-01	1.6E+03	2.5E-01	2.5E-01	1.6E+03	**2.5E-01**	**2.5E-01**	**1.6E+03**
DDD [C]	0	--	--	3.1E-03	--	--	3.1E-03	--	--	3.1E-04	--	--	3.1E-04	**--**	**--**	**3.1E-04**
DDE [C]	0	--	--	2.2E-03	--	--	2.2E-03	--	--	2.2E-04	--	--	2.2E-04	**--**	**--**	**2.2E-04**
DDT [C]	0	1.3E-01	1.0E-03	2.2E-03	1.3E-01	1.0E-03	2.2E-03	3.3E-02	2.5E-04	2.2E-04	3.3E-02	2.5E-04	2.2E-04	**3.3E-02**	**2.5E-04**	**2.2E-04**
Demeton	0	--	1.0E-01	--	--	1.0E-01	--	--	2.5E-02	--	--	2.5E-02	--	**--**	**2.5E-02**	**--**
Diazinon	0	8.2E-01	8.2E-01	--	8.2E-01	8.2E-01	--	2.1E-01	2.1E-01	--	2.1E-01	2.1E-01	--	**2.1E-01**	**2.1E-01**	**--**
Dibenz(a,h)anthracene [C]	0	--	--	1.8E-01	--	--	1.8E-01	--	--	1.8E-02	--	--	1.8E-02	**--**	**--**	**1.8E-02**
1,2-Dichlorobenzene	0	--	--	1.3E+03	--	--	1.3E+03	--	--	1.3E+02	--	--	1.3E+02	**--**	**--**	**1.3E+02**
1,3-Dichlorobenzene	0	--	--	9.6E+02	--	--	9.6E+02	--	--	9.6E+01	--	--	9.6E+01	**--**	**--**	**9.6E+01**
1,4-Dichlorobenzene	0	--	--	1.9E+02	--	--	1.9E+02	--	--	1.9E+01	--	--	1.9E+01	**--**	**--**	**1.9E+01**
3,3-Dichlorobenzidine[C]	0	--	--	2.8E-01	--	--	2.8E-01	--	--	2.8E-02	--	--	2.8E-02	**--**	**--**	**2.8E-02**
Dichlorobromomethane [C]	0	--	--	1.7E+02	--	--	1.7E+02	--	--	1.7E+01	--	--	1.7E+01	**--**	**--**	**1.7E+01**
1,2-Dichloroethane [C]	0	--	--	3.7E+02	--	--	3.7E+02	--	--	3.7E+01	--	--	3.7E+01	**--**	**--**	**3.7E+01**
1,1-Dichloroethylene	0	--	--	7.1E+03	--	--	7.1E+03	--	--	7.1E+02	--	--	7.1E+02	**--**	**--**	**7.1E+02**
1,2-trans-dichloroethylene	0	--	--	1.0E+04	--	--	1.0E+04	--	--	1.0E+03	--	--	1.0E+03	**--**	**--**	**1.0E+03**
2,4-Dichlorophenol	0	--	--	2.9E+02	--	--	2.9E+02	--	--	2.9E+01	--	--	2.9E+01	**--**	**--**	**2.9E+01**
1,2-Dichloropropane[C]	0	--	--	1.5E+02	--	--	1.5E+02	--	--	1.5E+01	--	--	1.5E+01	**--**	**--**	**1.5E+01**
1,3-Dichloropropene[C]	0	--	--	2.1E+02	--	--	2.1E+02	--	--	2.1E+01	--	--	2.1E+01	**--**	**--**	**2.1E+01**
Dieldrin [C]	0	7.1E-01	1.9E-03	5.4E-04	7.1E-01	1.9E-03	5.4E-04	1.8E-01	4.8E-04	5.4E-05	1.8E-01	4.8E-04	5.4E-05	**1.8E-01**	**4.8E-04**	**5.4E-05**
Diethyl Phthalate	0	--	--	4.4E+04	--	--	4.4E+04	--	--	4.4E+03	--	--	4.4E+03	**--**	**--**	**4.4E+03**
2,4-Dimethylphenol	0	--	--	8.5E+02	--	--	8.5E+02	--	--	8.5E+01	--	--	8.5E+01	**--**	**--**	**8.5E+01**
Dimethyl Phthalate	0	--	--	1.1E+06	--	--	1.1E+06	--	--	1.1E+05	--	--	1.1E+05	**--**	**--**	**1.1E+05**
Di-n-Butyl Phthalate	0	--	--	4.5E+03	--	--	4.5E+03	--	--	4.5E+02	--	--	4.5E+02	**--**	**--**	**4.5E+02**
2,4 Dinitrophenol	0	--	--	5.3E+03	--	--	5.3E+03	--	--	5.3E+02	--	--	5.3E+02	**--**	**--**	**5.3E+02**
2-Methyl-4,6-Dinitrophenol	0	--	--	2.8E+02	--	--	2.8E+02	--	--	2.8E+01	--	--	2.8E+01	**--**	**--**	**2.8E+01**
2,4-Dinitrotoluene [C]	0	--	--	3.4E+01	--	--	3.4E+01	--	--	3.4E+00	--	--	3.4E+00	**--**	**--**	**3.4E+00**
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	5.1E-08	--	--	5.1E-08	--	--	5.1E-09	--	--	5.1E-09	**--**	**--**	**5.1E-09**
1,2-Diphenylhydrazine[C]	0	--	--	2.0E+00	--	--	2.0E+00	--	--	2.0E-01	--	--	2.0E-01	**--**	**--**	**2.0E-01**
Alpha-Endosulfan	0	3.4E-02	8.7E-03	8.9E+01	3.4E-02	8.7E-03	8.9E+01	8.5E-03	2.2E-03	8.9E+00	8.5E-03	2.2E-03	8.9E+00	**8.5E-03**	**2.2E-03**	**8.9E+00**

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			**Most Limiting Allocations**		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	**Acute**	**Chronic**	**HH**
Beta-Endosulfan	0	3.4E-02	8.7E-03	8.9E+01	3.4E-02	8.7E-03	8.9E+01	8.5E-03	2.2E-03	8.9E+00	8.5E-03	2.2E-03	8.9E+00	**8.5E-03**	**2.2E-03**	**8.9E+00**
Alpha + Beta Endosulfan	0	3.4E-02	8.7E-03	--	3.4E-02	8.7E-03	--	8.5E-03	2.2E-03	--	8.5E-03	2.2E-03	--	**8.5E-03**	**2.2E-03**	**--**
Endosulfan Sulfate	0	--	--	8.9E+01	--	--	8.9E+01	--	--	8.9E+00	--	--	8.9E+00	**--**	**--**	**8.9E+00**
Endrin	0	3.7E-02	2.3E-03	6.0E-02	3.7E-02	2.3E-03	6.0E-02	9.3E-03	5.8E-04	6.0E-03	9.3E-03	5.8E-04	6.0E-03	**9.3E-03**	**5.8E-04**	**6.0E-03**
Endrin Aldehyde	0	--	--	3.0E-01	--	--	3.0E-01	--	--	3.0E-02	--	--	3.0E-02	**--**	**--**	**3.0E-02**
Ethylbenzene	0	--	--	2.1E+03	--	--	2.1E+03	--	--	2.1E+02	--	--	2.1E+02	**--**	**--**	**2.1E+02**
Fluoranthene	0	--	--	1.4E+02	--	--	1.4E+02	--	--	1.4E+01	--	--	1.4E+01	**--**	**--**	**1.4E+01**
Fluorene	0	--	--	5.3E+03	--	--	5.3E+03	--	--	5.3E+02	--	--	5.3E+02	**--**	**--**	**5.3E+02**
Guthion	0	--	1.0E-02	--	--	1.0E-02	--	--	2.5E-03	--	--	2.5E-03	--	**--**	**2.5E-03**	**--**
Heptachlor [C]	0	5.3E-02	3.6E-03	7.9E-04	5.3E-02	3.6E-03	7.9E-04	1.3E-02	9.0E-04	7.9E-05	1.3E-02	9.0E-04	7.9E-05	**1.3E-02**	**9.0E-04**	**7.9E-05**
Heptachlor Epoxide[C]	0	5.3E-02	3.6E-03	3.9E-04	5.3E-02	3.6E-03	3.9E-04	1.3E-02	9.0E-04	3.9E-05	1.3E-02	9.0E-04	3.9E-05	**1.3E-02**	**9.0E-04**	**3.9E-05**
Hexachlorobenzene[C]	0	--	--	2.9E-03	--	--	2.9E-03	--	--	2.9E-04	--	--	2.9E-04	**--**	**--**	**2.9E-04**
Hexachlorobutadiene[C]	0	--	--	1.8E+02	--	--	1.8E+02	--	--	1.8E+01	--	--	1.8E+01	**--**	**--**	**1.8E+01**
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	4.9E-02	--	--	4.9E-02	--	--	4.9E-03	--	--	4.9E-03	**--**	**--**	**4.9E-03**
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	1.7E-01	--	--	1.7E-01	--	--	1.7E-02	--	--	1.7E-02	**--**	**--**	**1.7E-02**
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	1.6E-01	--	1.8E+00	1.6E-01	--	1.8E+00	4.0E-02	--	1.8E-01	4.0E-02	--	1.8E-01	**4.0E-02**	**--**	**1.8E-01**
Hexachlorocyclopentadiene	0	--	--	1.1E+03	--	--	1.1E+03	--	--	1.1E+02	--	--	1.1E+02	**--**	**--**	**1.1E+02**
Hexachloroethane[C]	0	--	--	3.3E+01	--	--	3.3E+01	--	--	3.3E+00	--	--	3.3E+00	**--**	**--**	**3.3E+00**
Hydrogen Sulfide	0	--	2.0E+00	--	--	2.0E+00	--	--	5.0E-01	--	--	5.0E-01	--	**--**	**5.0E-01**	**--**
Indeno (1,2,3-cd) pyrene C	0	--	--	1.8E-01	--	--	1.8E-01	--	--	1.8E-02	--	--	1.8E-02	**--**	**--**	**1.8E-02**
Isophorone[C]	0	--	--	9.6E+03	--	--	9.6E+03	--	--	9.6E+02	--	--	9.6E+02	**--**	**--**	**9.6E+02**
Kepone	0	--	0.0E+00	--	--	0.0E+00	--	--	0.0E+00	--	--	0.0E+00	--	**--**	**0.0E+00**	**--**
Lead	0	2.4E+02	9.3E+00	--	2.4E+02	9.3E+00	--	6.0E+01	2.3E+00	--	6.0E+01	2.3E+00	--	**6.0E+01**	**2.3E+00**	**--**
Malathion	0	--	1.0E-01	--	--	1.0E-01	--	--	2.5E-02	--	--	2.5E-02	--	**--**	**2.5E-02**	**--**
Mercury	0	1.8E+00	9.4E-01	--	1.8E+00	9.4E-01	--	4.5E-01	2.4E-01	--	4.5E-01	2.4E-01	--	**4.5E-01**	**2.4E-01**	**--**
Methyl Bromide	0	--	--	1.5E+03	--	--	1.5E+03	--	--	1.5E+02	--	--	1.5E+02	**--**	**--**	**1.5E+02**
Methylene Chloride [C]	0	--	--	5.9E+03	--	--	5.9E+03	--	--	5.9E+02	--	--	5.9E+02	**--**	**--**	**5.9E+02**
Methoxychlor	0	--	3.0E-02	--	--	3.0E-02	--	--	7.5E-03	--	--	7.5E-03	--	**--**	**7.5E-03**	**--**
Mirex	0	--	0.0E+00	--	--	0.0E+00	--	--	0.0E+00	--	--	0.0E+00	--	**--**	**0.0E+00**	**--**
Nickel	0	7.4E+01	8.2E+00	4.6E+03	7.4E+01	8.2E+00	4.6E+03	1.9E+01	2.1E+00	4.6E+02	1.9E+01	2.1E+00	4.6E+02	**1.9E+01**	**2.1E+00**	**4.6E+02**
Nitrobenzene	0	--	--	6.9E+02	--	--	6.9E+02	--	--	6.9E+01	--	--	6.9E+01	**--**	**--**	**6.9E+01**
N-Nitrosodimethylamine[C]	0	--	--	3.0E+01	--	--	3.0E+01	--	--	3.0E+00	--	--	3.0E+00	**--**	**--**	**3.0E+00**
N-Nitrosodiphenylamine[C]	0	--	--	6.0E+01	--	--	6.0E+01	--	--	6.0E+00	--	--	6.0E+00	**--**	**--**	**6.0E+00**
N-Nitrosodi-n-propylamine[C]	0	--	--	5.1E+00	--	--	5.1E+00	--	--	5.1E-01	--	--	5.1E-01	**--**	**--**	**5.1E-01**
Nonylphenol	0	7.0E+00	1.7E+00	--	7.0E+00	1.7E+00	--	1.8E+00	4.3E-01	--	1.8E+00	4.3E-01	--	**1.8E+00**	**4.3E-01**	**--**
Parathion	0	--	--	--	--	--	--	--	--	--	--	--	--	**--**	**--**	**--**
PCB Total[C]	0	--	3.0E-02	6.4E-04	--	3.0E-02	6.4E-04	--	7.5E-03	6.4E-05	--	7.5E-03	6.4E-05	**--**	**7.5E-03**	**6.4E-05**
Pentachlorophenol [C]	0	1.3E+01	7.9E+00	3.0E+01	1.3E+01	7.9E+00	3.0E+01	3.3E+00	2.0E+00	3.0E+00	3.3E+00	2.0E+00	3.0E+00	**3.3E+00**	**2.0E+00**	**3.0E+00**

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			**Most Limiting Allocations**		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	**Acute**	**Chronic**	**HH**
Phenol	0	--	--	8.6E+05	--	--	8.6E+05	--	--	8.6E+04	--	--	8.6E+04	**--**	**--**	**8.6E+04**
Phosphorus (Elemental)	0	--	1.0E-01	--	--	1.0E-01	--	--	2.5E-02	--	--	2.5E-02	--	**--**	**2.5E-02**	**--**
Pyrene	0	--	--	4.0E+03	--	--	4.0E+03	--	--	4.0E+02	--	--	4.0E+02	**--**	**--**	**4.0E+02**
Radionuclides Beta and Photon Activity (mrem/yr)	0	--	--	4.0E+00	--	--	4.0E+00	--	--	4.0E-01	--	--	4.0E-01	**--**	**--**	**4.0E-01**
Selenium	0	2.9E+02	7.1E+01	4.2E+03	2.9E+02	7.1E+01	4.2E+03	7.3E+01	1.8E+01	4.2E+02	7.3E+01	1.8E+01	4.2E+02	**7.3E+01**	**1.8E+01**	**4.2E+02**
Silver	0	1.9E+00	--	--	1.9E+00	--	--	4.8E-01	--	--	4.8E-01	--	--	**4.8E-01**	**--**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	4.0E+01	--	--	4.0E+01	--	--	4.0E+00	--	--	4.0E+00	**--**	**--**	**4.0E+00**
Tetrachloroethylene[C]	0	--	--	3.3E+01	--	--	3.3E+01	--	--	3.3E+00	--	--	3.3E+00	**--**	**--**	**3.3E+00**
Thallium	0	--	--	4.7E-01	--	--	4.7E-01	--	--	4.7E-02	--	--	4.7E-02	**--**	**--**	**4.7E-02**
Toluene	0	--	--	6.0E+03	--	--	6.0E+03	--	--	6.0E+02	--	--	6.0E+02	**--**	**--**	**6.0E+02**
Toxaphene [C]	0	2.1E-01	2.0E-04	2.8E-03	2.1E-01	2.0E-04	2.8E-03	5.3E-02	5.0E-05	2.8E-04	5.3E-02	5.0E-05	2.8E-04	**5.3E-02**	**5.0E-05**	**2.8E-04**
Tributyltin	0	4.2E-01	7.4E-03	--	4.2E-01	7.4E-03	--	1.1E-01	1.9E-03	--	1.1E-01	1.9E-03	--	**1.1E-01**	**1.9E-03**	**--**
1,2,4-Trichlorobenzene	0	--	--	7.0E+01	--	--	7.0E+01	--	--	7.0E+00	--	--	7.0E+00	**--**	**--**	**7.0E+00**
1,1,2-Trichloroethane[C]		--	--	1.6E+02	--	--	1.6E+02	--	--	1.6E+01	--	--	1.6E+01	**--**	**--**	**1.6E+01**
Trichloroethylene [C]	0	--	--	3.0E+02	--	--	3.0E+02	--	--	3.0E+01	--	--	3.0E+01	**--**	**--**	**3.0E+01**
2,4,6-Trichlorophenol [C]	0	--	--	2.4E+01	--	--	2.4E+01	--	--	2.4E+00	--	--	2.4E+00	**--**	**--**	**2.4E+00**
Vinyl Chloride[C]	0	--	--	2.4E+01	--	--	2.4E+01	--	--	2.4E+00	--	--	2.4E+00	**--**	**--**	**2.4E+00**
Zinc	0	9.0E+01	8.1E+01	2.6E+04	9.0E+01	8.1E+01	2.6E+04	2.3E+01	2.0E+01	2.6E+03	2.3E+01	2.0E+01	2.6E+03	**2.3E+01**	**2.0E+01**	**2.6E+03**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. For transition zone waters, spreadsheet prints the lesser of the freshwater and saltwater water quality criteria.
6. Regular WLA = (WQC x WLA multiplier) - (WLA multiplier - 1)(background conc.)
7. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
8. Antideg. WLA = (Antideg. Baseline)(WLA multiplier) - (WLA multiplier - 1)(background conc.)

Metal	Site Specific Target Value (SSTV)
Antimony	6.4E+01
Arsenic III	5.4E+00
Cadmium	1.3E+00
Chromium III	#VALUE!
Chromium VI	7.5E+00
Copper	9.0E-01
Lead	1.4E+00
Mercury	1.4E-01
Nickel	1.2E+00
Selenium	1.1E+01
Silver	1.9E-01
Zinc	9.0E+00

Note: do not use QL's lower than the minimum QL's provided in agency guidance

8/23/2011 8:19:49 AM

Facility = The Tides Utilities, LLC North WWTP - 0.100 MGD Facility
Chemical = Ammonia as Nitrogen
Chronic averaging period = 30
WLAa = 0.115 mg/L
WLAc = 0.0173 mg/L
Q.L. = 0.2 mg/L
# samples/mo. = 4
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 3.49056926161022E-02 mg/L
Average Weekly limit = 3.49056926161022E-02 mg/L
Average Monthly LImit = 2.38659198809432E-02 mg/L

The data are:

9.0 mg/L

In accordance with GM 00-2011, the acute and chronic wasteload allocations from MSTRANTI were entered into STATS along with one datum of 9.0 mg/L in order to force a limit.

8/23/2011 8:25:45 AM

Facility = The Tides Utilities, LLC North WWTP - 0.100 MGD Facility
Chemical = Chlorine Produced Oxidant (CPO) -> Effluent TRC Limits
Chronic averaging period = 4
WLAa = 3.3 ug/L
WLAc = 1.9 ug/L
Q.L. = 0.1 ug/L
# samples/mo. = 90
# samples/wk. = 21

Summary of Statistics:

observations = 1
Expected Value = 20000
Variance = 1440000
C.V. = 0.6
97th percentile daily values = 48668.3
97th percentile 4 day average = 33275.8
97th percentile 30 day average= 24121.0
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 2.77889208970114 ug/L
Average Weekly limit = 1.44699904010998 ug/L
Average Monthly LImit = 1.27782537796093 ug/L

The data are:

20000 ug/L

In accordance with GM 00-2011, the acute and chronic wasteload allocations from MSTRANTI were entered into STATS along with one datum of 20000 ug/L (20 mg/L) in order to force a limit. These limits have been relocated to Part I.B.2.a of the permit. See fact sheet for additional information.

As indicated in GM 10-2003, the CPO in-stream saltwater limits are met by applying Total Residual Chlorine (TRC) limits to the facility's effluent.

2005 PERMIT

SALTWATER AND TRANSITION ZONES
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Tides Utilities North (formerly Tides Lodge) Permit No.: VA0029343 Version: OWP Guidance Memo 00-2011 (8/24/00)
Receiving Stream: Carter's Creek

Stream Information

Mean Hardness (as CaCO3) =	NA	mg/l
90th % Temperature (Annual) =	29.03	(° C)
90th % Temperature (Winter) =	NA-no tierin	(° C)
90th % Maximum pH =	9	
10th % Maximum pH =	7.55	
Tier Designation (1 or 2) =	2	
Early Life Stages Present Y/N =	Y	
Tidal Zone =	1	(1 = saltwater, 2 = transition zone)
Mean Salinity =	16.6	(g/kg)

Mixing Information

Design Flow (MGD)	0.0325
Acute WLA multiplier	32
Chronic WLA multiplier	32
Human health WLA multiplier	32

Effluent Information

Mean Hardness (as CaCO3) =	NA	mg/L
90 % Temperature (Annual) =	29.3	(° C)
90 % Temperature (Winter) =	NA-not tiere	(° C)
90 % Maximum pH =	8.79	SU
10 % Maximum pH =	NA	SU
Discharge Flow =	0.0325	MGD

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH
Acenapthene	0	--	--	2.7E+03	--	--	8.6E+04	--	--	2.7E+02	--	--	8.6E+03	--	--	8.6E+03
Acrolein		--	--	7.8E+02	--	--	2.5E+04	--	--	7.8E+01	--	--	2.5E+03	--	--	2.5E+03
Acrylonitrile [C]		--	--	6.6E+00	--	--	2.1E+02	--	--	6.6E-01	--	--	2.1E+01	--	--	2.1E+01
Aldrin [C]	0	1.3E+00	--	1.4E-03	4.2E+01	--	4.5E-02	3.3E-01	--	1.4E-04	1.0E+01	--	4.5E-03	1.0E+01	--	4.5E-03
Ammonia-N (mg/l) - Annual	0	4.7E-01	7.1E-02	--	1.5E+01	2.3E+00	--	1.2E-01	1.8E-02	--	3.8E+00	5.7E-01	--	3.8E+00	5.7E-01	--
Ammonia-N (mg/l) - Winter	0	#######	#######	--	#VALUE!	#VALUE!	--	#VALUE!	#VALUE!	--	#######	#VALUE!	--	#VALUE!	#VALUE!	--
Anthracene	0	--	--	1.1E+05	--	--	3.5E+06	--	--	1.1E+04	--	--	3.5E+05	--	--	3.5E+05
Antimony	0	--	--	4.3E+03	--	--	1.4E+05	--	--	4.3E+02	--	--	1.4E+04	--	--	1.4E+04
Arsenic	0	6.9E+01	3.6E+01	--	2.2E+03	1.2E+03	--	1.7E+01	9.0E+00	--	5.5E+02	2.9E+02	--	5.5E+02	2.9E+02	--
Benzene [C]	0	--	--	7.1E+02	--	--	2.3E+04	--	--	7.1E+01	--	--	2.3E+03	--	--	2.3E+03
Benzidine [C]		--	--	5.4E-03	--	--	1.7E-01	--	--	5.4E-04	--	--	1.7E-02	--	--	1.7E-02
Benzo (a) anthracene [C]	0	--	--	4.9E-01	--	--	1.6E+01	--	--	4.9E-02	--	--	1.6E+00	--	--	1.6E+00
Benzo (b) fluoranthene [C]	0	--	--	4.9E-01	--	--	1.6E+01	--	--	4.9E-02	--	--	1.6E+00	--	--	1.6E+00
Benzo (k) fluoranthene [C]	0	--	--	4.9E-01	--	--	1.6E+01	--	--	4.9E-02	--	--	1.6E+00	--	--	1.6E+00
Benzo (a) pyrene [C]	0	--	--	4.9E-01	--	--	1.6E+01	--	--	4.9E-02	--	--	1.6E+00	--	--	1.6E+00
Bis2-Chloroethyl Ether		--	--	1.4E+01	--	--	4.5E+02	--	--	1.4E+00	--	--	4.5E+01	--	--	4.5E+01
Bis2-Chloroisopropyl Ether		--	--	1.7E+05	--	--	5.4E+06	--	--	1.7E+04	--	--	5.4E+05	--	--	5.4E+05
Bromoform [C]	0	--	--	3.6E+03	--	--	1.2E+05	--	--	3.6E+02	--	--	1.2E+04	--	--	1.2E+04
Butylbenzylphthalate	0	--	--	5.2E+03	--	--	1.7E+05	--	--	5.2E+02	--	--	1.7E+04	--	--	1.7E+04
Cadmium	0	4.0E+01	8.8E+00	--	1.3E+03	2.8E+02	--	1.0E+01	2.2E+00	--	3.2E+02	7.0E+01	--	3.2E+02	7.0E+01	--
Carbon Tetrachloride [C]	0	--	--	4.4E+01	--	--	1.4E+03	--	--	4.4E+00	--	--	1.4E+02	--	--	1.4E+02
Chlordane [C]	0	9.0E-02	4.0E-03	2.2E-02	2.9E+00	1.3E-01	7.0E-01	2.3E-02	1.0E-03	2.2E-03	7.2E-01	3.2E-02	7.0E-02	7.2E-01	3.2E-02	7.0E-02
TRC	0			--			--	--	--	--	--	--	--	--	--	--
Chlorine Prod. Oxidant	0	1.3E+01	7.5E+00	--	4.2E+02	2.4E+02	--	3.3E+00	1.9E+00	--	1.0E+02	6.0E+01	--	1.0E+02	6.0E+01	--

2005 PERMIT

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations		
		Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH
Chlorobenzene		--	--	2.1E+04	--	--	6.7E+05	--	--	2.1E+03	--	--	6.7E+04	--	--	6.7E+04
Chlorodibromomethane[C]	0	--	--	3.4E+02	--	--	1.1E+04	--	--	3.4E+01	--	--	1.1E+03	--	--	1.1E+03
Chloroform [C]	0	--	--	2.9E+04	--	--	9.3E+05	--	--	2.9E+03	--	--	9.3E+04	--	--	9.3E+04
2-Chloronaphthalene	0	--	--	4.3E+03	--	--	1.4E+05	--	--	4.3E+02	--	--	1.4E+04	--	--	1.4E+04
2-Chlorophenol	0	--	--	4.0E+02	--	--	1.3E+04	--	--	4.0E+01	--	--	1.3E+03	--	--	1.3E+03
Chlorpyrifos	0	1.1E-02	5.6E-03	--	3.5E-01	1.8E-01	--	2.8E-03	1.4E-03	--	8.8E-02	4.5E-02	--	8.8E-02	4.5E-02	--
Chromium III	0			--			--	--	--	--	--	--	--	--	--	--
Chromium VI	0	1.1E+03	5.0E+01	--	3.5E+04	1.6E+03	--	2.8E+02	1.3E+01	--	8.8E+03	4.0E+02	--	8.8E+03	4.0E+02	--
Chrysene [C]	0	--	--	4.9E-01	--	--	1.6E+01	--	--	4.9E-02	--	--	1.6E+00	--	--	1.6E+00
Copper	0	9.3E+00	6.0E+00	--	3.0E+02	1.9E+02	--	2.3E+00	1.5E+00	--	7.4E+01	4.8E+01	--	7.4E+01	4.8E+01	--
Cyanide	0	1.0E+00	1.0E+00	2.2E+05	3.2E+01	3.2E+01	6.9E+06	2.5E-01	2.5E-01	2.2E+04	8.0E+00	8.0E+00	6.9E+05	8.0E+00	8.0E+00	6.9E+05
DDD [C]	0	--	--	8.4E-03	--	--	2.7E-01	--	--	8.4E-04	--	--	2.7E-02	--	--	2.7E-02
DDE [C]	0	--	--	5.9E-03	--	--	1.9E-01	--	--	5.9E-04	--	--	1.9E-02	--	--	1.9E-02
DDT [C]	0	1.3E-01	1.0E-03	5.9E-03	4.2E+00	3.2E-02	1.9E-01	3.3E-02	2.5E-04	5.9E-04	1.0E+00	8.0E-03	1.9E-02	1.0E+00	8.0E-03	1.9E-02
Demeton	0	--	1.0E-01	--	--	3.2E+00	--	--	2.5E-02	--	--	8.0E-01	--	--	8.0E-01	--
Dibenz(a,h)anthracene [C]	0	--	--	4.9E-01	--	--	1.6E+01	--	--	4.9E-02	--	--	1.6E+00	--	--	1.6E+00
Dibutyl phthalate	0	--	--	1.2E+04	--	--	3.8E+05	--	--	1.2E+03	--	--	3.8E+04	--	--	3.8E+04
Dichloromethane (Methylene Chloride)[C]	0	--	--	1.6E+04	--	--	5.1E+05	--	--	1.6E+03	--	--	5.1E+04	--	--	5.1E+04
1,2-Dichlorobenzene	0	--	--	1.7E+04	--	--	5.4E+05	--	--	1.7E+03	--	--	5.4E+04	--	--	5.4E+04
1,3-Dichlorobenzene	0	--	--	2.6E+03	--	--	8.3E+04	--	--	2.6E+02	--	--	8.3E+03	--	--	8.3E+03
1,4-Dichlorobenzene	0	--	--	2.6E+03	--	--	8.3E+04	--	--	2.6E+02	--	--	8.3E+03	--	--	8.3E+03
3,3-Dichlorobenzidine[C]	0	--	--	7.7E-01	--	--	2.5E+01	--	--	7.7E-02	--	--	2.5E+00			
Dichlorobromomethane [C]	0	--	--	4.6E+02	--	--	1.5E+04	--	--	4.6E+01	--	--	1.5E+03	--	--	1.5E+03
1,2-Dichloroethane [C]	0	--	--	9.9E+02	--	--	3.2E+04	--	--	9.9E+01	--	--	3.2E+03	--	--	3.2E+03
1,1-Dichloroethylene	0	--	--	1.7E+04	--	--	5.4E+05	--	--	1.7E+03	--	--	5.4E+04	--	--	5.4E+04
1,2-trans-dichloroethylene	0	--	--	1.4E+05	--	--	4.5E+06	--	--	1.4E+04	--	--	4.5E+05	--	--	4.5E+05
2,4-Dichlorophenol	0	--	--	7.9E+02	--	--	2.5E+04	--	--	7.9E+01	--	--	2.5E+03	--	--	2.5E+03
1,2-Dichloropropane[C]	0	--	--	3.9E+02	--	--	1.2E+04	--	--	3.9E+01	--	--	1.2E+03	--	--	1.2E+03
1,3-Dichloropropene	0	--	--	1.7E+03	--	--	5.4E+04	--	--	1.7E+02	--	--	5.4E+03	--	--	5.4E+03
Dieldrin [C]	0	7.1E-01	1.9E-03	1.4E-03	2.3E+01	6.1E-02	4.5E-02	1.8E-01	4.8E-04	1.4E-04	5.7E+00	1.5E-02	4.5E-03	5.7E+00	1.5E-02	4.5E-03
Diethyl Phthalate	0	--	--	1.2E+05	--	--	3.8E+06	--	--	1.2E+04	--	--	3.8E+05	--	--	3.8E+05
Di-2-Ethylhexyl Phthalate [C]	0	--	--	5.9E+01	--	--	1.9E+03	--	--	5.9E+00	--	--	1.9E+02	--	--	1.9E+02
2,4-Dimethylphenol	0	--	--	2.3E+03	--	--	7.4E+04	--	--	2.3E+02	--	--	7.4E+03	--	--	7.4E+03
Dimethyl Phthalate	0	--	--	2.9E+06	--	--	9.3E+07	--	--	2.9E+05	--	--	9.3E+06	--	--	9.3E+06
Di-n-Butyl Phthalate	0	--	--	1.2E+04	--	--	3.8E+05	--	--	1.2E+03	--	--	3.8E+04	--	--	3.8E+04
2,4 Dinitrophenol	0	--	--	1.4E+04	--	--	4.5E+05	--	--	1.4E+03	--	--	4.5E+04	--	--	4.5E+04
2-Methyl-4,6-Dinitrophenol	0	--	--	7.65E+02	--	--	2.4E+04	--	--	7.7E+01	--	--	2.4E+03	--	--	2.4E+03
2,4-Dinitrotoluene [C]	0	--	--	9.1E+01	--	--	2.9E+03	--	--	9.1E+00	--	--	2.9E+02	--	--	2.9E+02
Dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin) (ppq)	0	--	--	1.2E-06	--	--	3.8E-05	--	--	1.2E-07	--	--	3.8E-06	--	--	3.8E-06
1,2-Diphenylhydrazine[C]	0	--	--	5.4E+00	--	--	1.7E+02	--	--	5.4E-01	--	--	1.7E+01	--	--	1.7E+01
Alpha-Endosulfan	0	3.4E-02	8.7E-03	2.4E+02	1.1E+00	2.8E-01	7.7E+03	8.5E-03	2.2E-03	2.4E+01	2.7E-01	7.0E-02	7.7E+02	2.7E-01	7.0E-02	7.7E+02

2005 PERMIT

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH
Beta-Endosulfan	0	3.4E-02	8.7E-03	2.4E+02	1.1E+00	2.8E-01	7.7E+03	8.5E-03	2.2E-03	2.4E+01	2.7E-01	7.0E-02	7.7E+02	2.7E-01	7.0E-02	7.7E+02
Endosulfan Sulfate	0	--	--	2.4E+02	--	--	7.7E+03	--	--	2.4E+01	--	--	7.7E+02	--	--	7.7E+02
Endrin	0	3.7E-02	2.3E-03	8.1E-01	1.2E+00	7.4E-02	2.6E+01	9.3E-03	5.8E-04	8.1E-02	3.0E-01	1.8E-02	2.6E+00	3.0E-01	1.8E-02	2.6E+00
Endrin Aldehyde	0	--	--	8.1E-01	--	--	2.6E+01	--	--	8.1E-02	--	--	2.6E+00	--	--	2.6E+00
Ethylbenzene	0	--	--	2.9E+04	--	--	9.3E+05	--	--	2.9E+03	--	--	9.3E+04	--	--	9.3E+04
Fluoranthene	0	--	--	3.7E+02	--	--	1.2E+04	--	--	3.7E+01	--	--	1.2E+03	--	--	1.2E+03
Fluorene	0	--	--	1.4E+04	--	--	4.5E+05	--	--	1.4E+03	--	--	4.5E+04	--	--	4.5E+04
Guthion	0	--	1.0E-02	--	--	3.2E-01	--	--	2.5E-03	--	--	8.0E-02	--	--	8.0E-02	--
Heptachlor [C]	0	5.3E-02	3.6E-03	2.1E-03	1.7E+00	1.2E-01	6.7E-02	1.3E-02	9.0E-04	2.1E-04	4.2E-01	2.9E-02	6.7E-03	4.2E-01	2.9E-02	6.7E-03
Heptachlor Epoxide [C]	0	5.3E-02	3.6E-03	1.1E-03	1.7E+00	1.2E-01	3.5E-02	1.3E-02	9.0E-04	1.1E-04	4.2E-01	2.9E-02	3.5E-03	4.2E-01	2.9E-02	3.5E-03
Hexachlorobenzene [C]	0	--	--	7.7E-03	--	--	2.5E-01	--	--	7.7E-04	--	--	2.5E-02	--	--	2.5E-02
Hexachlorobutadiene [C]	0	--	--	5.0E+02	--	--	1.6E+04	--	--	5.0E+01	--	--	1.6E+03	--	--	1.6E+03
Hexachlorocyclohexane Alpha-BHC [C]	0	--	--	1.3E-01	--	--	4.2E+00	--	--	1.3E-02	--	--	4.2E-01	--	--	4.2E-01
Hexachlorocyclohexane Beta-BHC [C]	0	--	--	4.6E-01	--	--	1.5E+01	--	--	4.6E-02	--	--	1.5E+00	--	--	1.5E+00
Hexachlorocyclohexane Gamma-BHC [C] (Lindane)	0	1.6E-01	--	6.3E-01	5.1E+00	--	2.0E+01	4.0E-02	--	6.3E-02	1.3E+00	--	2.0E+00	1.3E+00	--	2.0E+00
Hexachlorocyclopentadiene	0	--	--	1.7E+04	--	--	5.4E+05	--	--	1.7E+03	--	--	5.4E+04	--	--	5.4E+04
Hexachloroethane [C]	0	--	--	8.9E+01	--	--	2.8E+03	--	--	8.9E+00	--	--	2.8E+02	--	--	2.8E+02
Hydrogen Sulfide	0	--	2.0E+00		--	6.4E+01	--	--	5.0E-01	0.0E+00	--	1.6E+01	0.0E+00	--	1.6E+01	--
Indeno (1,2,3-cd) pyrene C	0	--	--	4.9E-01	--	--	1.6E+01	--	--	4.9E-02	--	--	1.6E+00	--	--	1.6E+00
Isophorone [C]	0	--	--	2.6E+04	--	--	8.3E+05	--	--	2.6E+03	--	--	8.3E+04	--	--	8.3E+04
Kepone	0	--	0.0E+00	--	--	0.0E+00	--	--	0.0E+00	--	--	0.0E+00	--	--	0.0E+00	--
Lead	0	2.4E+02	9.3E+00	--	7.7E+03	3.0E+02	--	6.0E+01	2.3E+00	--	1.9E+03	7.4E+01	--	1.9E+03	7.4E+01	--
Malathion	0	--	1.0E-01	--	--	3.2E+00	--	--	2.5E-02	--	--	8.0E-01	--	--	8.0E-01	--
Mercury	0	1.8E+00	9.4E-01	5.1E-02	5.8E+01	3.0E+01	1.6E+00	4.5E-01	2.4E-01	5.1E-03	1.4E+01	7.5E+00	1.6E-01	1.4E+01	7.5E+00	1.6E-01
Methyl Bromide	0	--	--	4.0E+03	--	--	1.3E+05	--	--	4.0E+02	--	--	1.3E+04	--	--	1.3E+04
Methoxychlor	0	--	3.0E-02	--	--	9.6E-01	--	--	7.5E-03	--	--	2.4E-01	--	--	2.4E-01	--
Mirex	0	--	0.0E+00	--	--	0.0E+00	--	--	0.0E+00	--	--	0.0E+00	--	--	0.0E+00	--
Monochlorobenzene	0	--	--	2.1E+04	--	--	6.7E+05	--	--	2.1E+03	--	--	6.7E+04	--	--	6.7E+04
Nickel	0	7.4E+01	8.2E+00	4.6E+03	2.4E+03	2.6E+02	1.5E+05	1.9E+01	2.1E+00	4.6E+02	5.9E+02	6.6E+01	1.5E+04	5.9E+02	6.6E+01	1.5E+04
Nitrobenzene	0	--	--	1.9E+03	--	--	6.1E+04	--	--	1.9E+02	--	--	6.1E+03	--	--	6.1E+03
N-Nitrosodimethylamine [C]	0	--	--	8.1E+01	--	--	2.6E+03	--	--	8.1E+00	--	--	2.6E+02	--	--	2.6E+02
N-Nitrosodiphenylamine [C]	0	--	--	1.6E+02	--	--	5.1E+03	--	--	1.6E+01	--	--	5.1E+02	--	--	5.1E+02
N-Nitrosodi-n-propylamine [C]	0	--	--	1.4E+01	--	--	4.5E+02	--	--	1.4E+00	--	--	4.5E+01	--	--	4.5E+01
Parathion	0			--			--	--	--	--	--	--	--	--	--	--
PCB-1016	0	--	3.0E-02	--	--	9.6E-01	--	--	7.5E-03	--	--	2.4E-01	--	--	2.4E-01	--
PCB-1221	0	--	3.0E-02	--	--	9.6E-01	--	--	7.5E-03	--	--	2.4E-01	--	--	2.4E-01	--
PCB-1232	0	--	3.0E-02	--	--	9.6E-01	--	--	7.5E-03	--	--	2.4E-01	--	--	2.4E-01	--
PCB-1242	0	--	3.0E-02	--	--	9.6E-01	--	--	7.5E-03	--	--	2.4E-01	--	--	2.4E-01	--
PCB-1248	0	--	3.0E-02	--	--	9.6E-01	--	--	7.5E-03	--	--	2.4E-01	--	--	2.4E-01	--
PCB-1254	0	--	3.0E-02	--	--	9.6E-01	--	--	7.5E-03	--	--	2.4E-01	--	--	2.4E-01	--

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Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations		
		Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH
PCB-1260	0	--	3.0E-02	--	--	9.6E-01	--	--	7.5E-03	--	--	2.4E-01	--	--	**2.4E-01**	--
PCB Total[C]	0	--	--	1.7E-03	--	--	5.4E-02	--	--	1.7E-04	--	--	5.4E-03	--	--	**5.4E-03**
Pentachlorophenol [C]	0	1.3E+01	7.9E+00	8.2E+01	4.2E+02	2.5E+02	2.6E+03	3.3E+00	2.0E+00	8.2E+00	1.0E+02	6.3E+01	2.6E+02	**1.0E+02**	**6.3E+01**	**2.6E+02**
Phenol	0	--	--	4.6E+06	--	--	1.5E+08	--	--	4.6E+05	--	--	1.5E+07	--	--	**1.5E+07**
Phosphorus (Elemental)	0	--	0.1	--	--	3.2E+00	--	--	2.5E-02	--	--	8.0E-01	--	--	**8.0E-01**	--
Pyrene	0	--	--	1.1E+04	--	--	3.5E+05	--	--	1.1E+03	--	--	3.5E+04	--	--	**3.5E+04**
Radionuclides (pCi/l except Beta/Photon)	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gross Alpha Activity	0	--	--	1.5E+01	--	--	4.8E+02	--	--	1.5E+00	--	--	4.8E+01	--	--	**4.8E+01**
Beta and Photon Activity (mrem/yr)	0	--	--	4.0E+00	--	--	1.3E+02	--	--	4.0E-01	--	--	1.3E+01	--	--	**1.3E+01**
Strontium-90	0	--	--	8.0E+00	--	--	2.6E+02	--	--	8.0E-01	--	--	2.6E+01	--	--	**2.6E+01**
Tritium	0	--	--	2.0E+04	--	--	6.4E+05	--	--	2.0E+03	--	--	6.4E+04	--	--	**6.4E+04**
Selenium	0	3.0E+02	7.1E+01	1.1E+04	9.6E+03	2.3E+03	3.5E+05	7.5E+01	1.8E+01	1.1E+03	2.4E+03	5.7E+02	3.5E+04	**2.4E+03**	**5.7E+02**	**3.5E+04**
Silver	0	2.0E+00	--	--	6.4E+01	--	--	5.0E-01	--	--	1.6E+01	--	--	**1.6E+01**	--	--
1,1,2,2-Tetrachloroethane[C]	0	--	--	1.1E+02	--	--	3.5E+03	--	--	1.1E+01	--	--	3.5E+02	--	--	**3.5E+02**
Tetrachloroethylene[C]	0	--	--	8.9E+01	--	--	2.8E+03	--	--	8.9E+00	--	--	2.8E+02	--	--	**2.8E+02**
Thallium	0	--	--	6.3E+00	--	--	2.0E+02	--	--	6.3E-01	--	--	2.0E+01	--	--	**2.0E+01**
Toluene	0	--	--	2.0E+05	--	--	6.4E+06	--	--	2.0E+04	--	--	6.4E+05	--	--	**6.4E+05**
Toxaphene [C]	0	2.1E-01	2.0E-04	7.5E-03	6.7E+00	6.4E-03	2.4E-01	5.3E-02	5.0E-05	7.5E-04	1.7E+00	1.6E-03	2.4E-02	**1.7E+00**	**1.6E-03**	**2.4E-02**
Tributyltin	0	3.8E-01	1.0E-03	--	1.2E+01	3.2E-02	--	9.5E-02	2.5E-04	--	3.0E+00	8.0E-03	--	**3.0E+00**	**8.0E-03**	--
1,2,4-Trichlorobenzene	0	--	--	9.4E+02	--	--	3.0E+04	--	--	9.4E+01	--	--	3.0E+03	--	--	**3.0E+03**
1,1,2-Trichloroethane[C]		--	--	4.2E+02	--	--	1.3E+04	--	--	4.2E+01	--	--	1.3E+03	--	--	**1.3E+03**
Trichloroethylene [C]	0	--	--	8.1E+02	--	--	2.6E+04	--	--	8.1E+01	--	--	2.6E+03	--	--	**2.6E+03**
2,4,6-Trichlorophenol [C]	0	--	--	6.5E+01	--	--	2.1E+03	--	--	6.5E+00	--	--	2.1E+02	--	--	**2.1E+02**
Vinyl Chloride[C]	0	--	--	6.1E+01	--	--	2.0E+03	--	--	6.1E+00	--	--	2.0E+02	--	--	**2.0E+02**
Zinc	0	9.0E+01	8.1E+01	6.9E+04	2.9E+03	2.6E+03	2.2E+06	2.3E+01	2.0E+01	6.9E+03	7.2E+02	6.5E+02	2.2E+05	**7.2E+02**	**6.5E+02**	**2.2E+05**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. For transition zone waters, spreadsheet prints the lesser of the freshwater and saltwater water quality criteria.
6. Regular WLA = (WQC x WLA multiplier) - (WLA multiplier - 1)(background conc.)
7. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
8. Antideg. WLA = (Antideg. Baseline)(WLA multiplier) - (WLA multiplier - 1)(background conc.)

Metal	Site Specific Target Value (SSTV)
Antimony	1.4E+04
Arsenic III	1.7E+02
Cadmium	4.2E+01
Chromium III	#VALUE!
Chromium VI	2.4E+02
Copper	2.9E+01
Lead	4.5E+01
Mercury	1.6E-01
Nickel	3.9E+01
Selenium	3.4E+02
Silver	6.4E+00
Zinc	2.9E+02

Note: do not use QL's lower than the minimum QL's provided in agency guidance

2005 PERMIT

6/20/2005 8:22:57 AM

Facility = Tides North 0.0325 MGD at 32:1
Chemical = ammonia
Chronic averaging period = 30
WLAa = 3.8
WLAc = 0.57
Q.L. = 0.2
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 1.1500719532473
Average Weekly limit = 1.1500719532473
Average Monthly LImit = 1.1500719532473

The data are:

9

6/21/2005 9:03:25 AM

2005 PERMIT

Facility = Tides North chlorine 0.04 MGD plant
Chemical = chlorine
Chronic averaging period = 4
WLAa = 3.3
WLAc = 1.9
Q.L. = 100
# samples/mo. = 30
# samples/wk. = 8

Summary of Statistics:

observations = 1
Expected Value = 20000
Variance = 1440000
C.V. = 0.6
97th percentile daily values = 48668.3
97th percentile 4 day average = 33275.8
97th percentile 30 day average= 24121.0
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 2.77889208970114
Average Weekly limit = 1.65762326468019
Average Monthly LImit = 1.37727773176037

The data are:

20000

This analysis is for both the 0.0325 MGD + 0.04 MGD facilities - since the monitoring frequency is the same

Attachment I

Stream Sanitation Analysis

ESTUARY SITE EVALUATION and DATA PREPARATION FORM

Name of Stream Cohen's creek Topographic map Quinton

Date of inspection _____ Inspector SMosca

Name of Discharge Tides Inn STP River mile 8cm of 14cm Ind. Church Prong (1.18)

1mi = 6.8cm 14cm x 1mi/6.8cm = 2.06 mi

2.4 x 1.5 = 3.6 mg/L

Proposed limits: BOD5 24 TKN 3.6 D.O. 02 FLOW 4.95 MGD x 1.548 cfs/MGD = 07659 cfs

8cm x 2mi/14cm = 1.1 mi

Are there major Tributaries in the section you want to model ? NO

If yes, enter data for the mouth of the stream: BOD5 _____ TKN _____ D.O. _____ Flow _____ R.M. _____

BOD5 _____ TKN _____ D.O. _____ Flow _____ R.M. _____

BOD5 _____ TKN _____ D.O. _____ Flow _____ R.M. _____

BOD5 _____ TKN _____ D.O. _____ Flow _____ R.M. _____

Are there marshes bordering the stream you want to model ? NO

If yes enter the % of the length that is bordered by marsh _____

Is excessive algae a problem in this stream ? NO

River mile of fall line 2.06 River mile of model beginning 2.06

River mile of model end 0.0 Number of segments you want in model 5

Estimate the following at model beginning (background conditions):

7Q10 0 BOD5 _____ TKN _____ D.O. _____

Complete the following for as many points as you have data for:

R.M.	Width	Depth	Temperature	
0.0	(3454 ft) 0.18 mi	5 ft	27	4.5cm width x 1mi/6.8cm = 0.66
0.34	1.5cm (1165) 0.22mi x 5280 ft/mi = 1162.8 ft	5 ft	27	
0.66	(944) 1.5cm x 6.8 = 10.2 x 0.37 x 5280	4 ft	27	
1.18	6cm = 774.5 ft	3 ft	29	Discharge
2.06	0.5cm (388.8 ft)	2 ft	29	
------	------	------	-------	
------	------	------	-------	

2 pts BOD — RM 0.19 3.0 (90% percentile value) RM 1.18 24.0 (discharge)

1 pt TKN 3.6 mg/L

2 pt DO — 90% percentile 6.9 11.9 1.0 10.7

12 cm Kappa length x 25mi/4.7cm = 63.8 mi length

Cohen's Creek 10.7 cm 63.8 - 56.9 = 6.89 mi

Type of stream being modeled: (see page 64 of manual) _____

Confluence	river mile	stream type	length
A	_____	1	_____
B	6.89mi	2	_____
C	_____	3	_____
D	_____	(4)	_____
E	_____	5	_____
		6	_____

12/12/91 Conversation with Mark Bushing re: Carters Creek WQ

2 stations - River mile 0.19 + RM 1.06
(furthest from Tides Inn)

RM 0.19 - data compiled 1976 - 1984
Max Temp 28.5 min 0 average 17.22
Max DO 14.0 min 5.2 mean 8.94
Max BOD 7.0 min 1.0 $\bar{x}$ 2.125 $\frac{59}{\text{Lake}}$

RM 1.06 data 1976 - 1979
no BOD data
Temperature Max 29.5 min 1.5 $\bar{x}$ 19.1
DO max 11.59 min 5.79 $\bar{x}$ 8.23

Percentile Data

	90th percentile		95th percentile	
RM 0.19	DO 11.90		DO 13.0	} RM 0.19
	BOD 3.0		BOD 4.0	
RM 1.06	Temp 27° DO 10.79		DO 11.59	RM 1.06
	Temp 29°			

TIDES GOLF LODGE
29343

**** ENTER 1 IF YOU HAVE PERFORMED A SITE INSPECTION ****

**** OTHERWISE JUST PUSH ENTER ****
1

**** ENTER 1 IF EXCESSIVE ALGAE IS A PROBLEM ****

**** OTHERWISE JUST PUSH ENTER ****

**** ENTER 1 IF SIGNIFICANT MARSHES BORDER THE STREAM ****

**** SIGNIFICANT IS GREATER THEN 5% OF THE LENGTH BEING MARSH ****

**** OTHERWISE JUST PUSH ENTER ****

**** WHAT IS THE NAME OF THE STREAM? *****

**** INPUT RIVER MILE AND WIDTH (ft) FOR EACH POINT *****
  POINT # 1
0.0
3494.0
  POINT # 2
0.34
1165.0
  POINT # 3
0.53
1941.0
  POINT # 4
0.66
1165.0
  POINT # 5
1.18
776.5
  POINT # 6
2.0
388.2
A DIAGRAM WILL BE PUT ON THE SCREEN TO HELP YOU ENTER
DATA THAT WILL ALLOW CALCULATION OF THE DISPERSION AND VELOCITY ****
YOU WILL BE ASKED FOR STREAM TYPE, LENGTH AND RIVER MILE FOR YOUR SYSTEM
---- PUSH ENTER TO CONTINUE ----

```
*****  WHAT TYPE IS YOUR ESTUARY?  ******
*****  ENTER 9 TO SEE DIAGRAM AGAIN  ******
4
AT WHAT R.M. IS CONFLUENCE MARKED B?
6.89
HOW LONG IS THE TYPE 3 STREAM ? (MI)
63.8

**** HOW MANY POINTS DO YOU HAVE TEMPERATURE DATA FOR?, INTEGER ****
2

**** INPUT RIVER MILE AND TEMPERATURE (C) FOR EACH POINT******
   POINT #   1
0.19
27.0
   POINT #   2
1.06
29.0

*** HOW MANY POINTS DO YOU HAVE DEPTH DATA FOR?, INTEGER *****
6

**** INPUT RIVER MILE AND DEPTH (ft) FOR EACH POINT *****
   POINT #   1


1.06
29.0

*** HOW MANY POINTS DO YOU HAVE DEPTH DATA FOR?, INTEGER *****
6

**** INPUT RIVER MILE AND DEPTH (ft) FOR EACH POINT *****
   POINT #   1
0.00
5.0
   POINT #   2
0.34
5.0
   POINT #   3
0.53
4.0
   POINT #   4
0.66
3.0
   POINT #   5
1.18
3.0
   POINT #   6
2.0
2.0
```

```
**** INPUT RIVER MILE AND FLOW (cfs) FOR EACH POINT *****
   POINT #   1
0.34
0.00619
   POINT #   2
0.66
0.00928
   POINT #   3
0.96
0.00928
   POINT #   4
1.18
0.07659
   POINT #   5
2.0
0.0503

*** HOW MANY POINTS DO YOU HAVE BOD5 DATA FOR?, INTEGER  *****
5

**** INPUT RIVER MILE, FLOW AND BOD5 FOR EACH POINT **** *
   POINT #   1
0.34
0


**** INPUT RIVER MILE, FLOW AND BOD5 FOR EACH POINT **** *
   POINT #   1
0.34
0.00619
166
   POINT #   2
0.66
0.00928
150
   POINT #   3
0.96
0.00928
142
   POINT #   4
1.18
0.07659
24.0
   POINT #   5
2.0
0.0503
36.0
***** DO YOU WANT TO SPECIFY FIXED BOD5 CONCENTRATIONS? *****
***** ENTER 1 FOR YES .... 0 FOR NO *****
```

0 - No

TKN points

```
0.34
0.00619
1.5
   POINT #    2
0.66
0.00928
1.5
   POINT #    3
0.96
0.00928
1.5
   POINT #    4
1.18
0.07659
3.6
   POINT #    5
2.0
0.0503
1.5
***** DO YOU WANT TO SPECIFY FIXED NBOD CONCENTRATIONS? *****
***** ENTER 1 FOR YES .... 0 FOR NO *****
0

*** HOW MANY POINTS DO YOU HAVE D.O. DATA FOR?, INTEGER *****


0

*** HOW MANY POINTS DO YOU HAVE D.O. DATA FOR?, INTEGER *****
2

**** INPUT RIVER MILE, FLOW AND  D.O. FOR EACH POINT *****
   POINT #    1
0.19

5.2
   POINT #    2
1.06
0.07659
5.79
***** DO YOU WANT TO SPECIFY FIXED D.O. CONCENTRATIONS? *****
***** ENTER 1 FOR YES .... 0 FOR NO *****
1
***** HOW MANY POINTS DO YOU WANT TO SPECITY? INTEGER *****
1
**** ENTER THE RIVER MILE AND FIXED CONCENTRATION FOR EACH POINT *****
   POINT #    1
0.19
5.2
WHAT DO YOU WANT TO NAME THE DATA FILE?
```

a:fidmod1.dat => fidmod.dat

Tide mdl. dat

```
rter's Creek
     .000      2.060      2.060          5
TA
DTH             6
   1              .000    3494.000
   2              .340    1165.000
   3              .530    1941.000
   4              .660    1165.000
   5             1.180     776.500
   6             2.000     388.200
SP              2
   1             2.060        .000
   2              .000     701.959
LO              2
   1             2.060        .000
   2              .000        .108
MP              2
   1              .190      27.000
   2             1.060      29.000
DI              1
   1             1.030       1.500
ECAY            1
   1             1.030        .150
ECAY            1
   1             1.030        .075
3               6
   1              .000       5.000
   2              .340       5.000
   3              .530       4.000
   4              .660       3.000
   5             1.180       3.000
   6             2.000       2.000
-SATDO
-REAER
TOP
LOW
                  .340        .006
                  .660        .009
                  .960        .009
                 1.180        .077
                 2.000        .050
TOP
BOD
                  .340        .006       .415
                  .660        .009       .375
                  .960        .009       .355
                 1.180        .077     60.000
                 2.000        .050     90.000
TOP
BOD
                  .340        .006       .000
                  .660        .009       .000
                  .960        .009       .000
                 1.180        .077      2.598
                 2.000        .050       .000
TOP
O
                  .190        .000      5.200
                 1.060        .077      5.790
IXED              .190                  5.200
TOP
```

← TKN of 3.6 entered

} min oxygen values, Carter's Creek

1cdenCJL.Out

**** R E G I O N A L M O D E L I N G S Y S T E M *****

**** FEATURING *****

**** A U T O $ $ W A T E R Q U A L I T Y M O D E L *****

**** STEADY STATE WATER QUALITY MODEL *****
**** RUN TITLE .....Carter's Creek

**** BASIC NETWORK DATA *****
**** RIVER MILE OF DOWNSTREAM END... .00
**** RIVER MILE OF UPSTREAM END..... 2.06
**** RIVER MILE OF FALL LINE..... 2.06
**** NUMBER OF SECTIONS..... 5

****
****
**** *****
**** E S T U A R Y / S T R E A M I N P U T D A T A *****
**** *****
****
****

**** CHANNEL WIDTHS (FT) *****

CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE
1	.21	.208E+04	4	1.44	652.
2	.62	.142E+04	5	1.85	457.
3	1.03	889.			

**** JUNCTION SURFACE AREAS (SQFT) *****

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	.453E+07	4	1.24	.168E+07
2	.41	.381E+07	5	1.65	.121E+07
3	.82	.251E+07	6	2.06	.995E+06

**** DISPERSION COEFFICIENTS (SQFT/SEC) *****

CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE
1	.21	632.	4	1.44	211.
2	.62	491.	5	1.85	70.2
3	1.03	351.			

**** AVERAGE CHANNEL TIDAL VELOCITIES (FT/SEC) *****

CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE
1	.21	.972E-01	4	1.44	.324E-01
2	.62	.756E-01	5	1.85	.108E-01
3	1.03	.540E-01			

**** JUNCTION WATER TEMPERATURES (DEG-C) **** *

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	27.0	4	1.24	29.0
2	.41	27.5	5	1.65	29.0
3	.82	28.5	6	2.06	29.0

**** OXYGEN UPTAKE OF SEDIMENTS (GM O2/SQM/DAY) *****

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	1.50	4	1.24	1.50
2	.41	1.50	5	1.65	1.50
3	.82	1.50	6	2.06	1.50

**** CBOD DECAY RATES CORRECTED TO STREAM TEMP - (1/DAY) *****

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	.207	4	1.24	.227
2	.41	.212	5	1.65	.227
3	.82	.221	6	2.06	.227

**** NBOD DECAY RATES CORRECTED TO STREAM TEMP - (1/DAY) *****

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	.129	4	1.24	.150
2	.41	.134	5	1.65	.150
3	.82	.144	6	2.06	.150

**** A3 COEFFICIENT FOR FLOW EQUATION *****
* REPRESENTS DEPTH OF FLOW IF A1 AND/OR A2 ARE ZERO ***

CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE
1	.21	5.00	4	1.44	2.68
2	.62	3.32	5	1.85	2.18
3	1.03	3.00			

*** COMPUTED OXYGEN SATURATION CONCENTRATIONS (PPM) *****

JUNC	RIVER		JUNC	RIVER	

1	.00	9.61	4	1.24	9.73
2	.41	9.63	5	1.65	9.73
3	.82	9.69	6	2.06	9.73

****
****
****
****
****
****
****

DEPTH OR VELOCITY DEPENDENT VARIABLES

***** CROSS-SECTIONAL AREAS OF CHANNELS (SQFT) *****

CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE
1	.21	.104E+05	4	1.44	.175E+04
2	.62	.470E+04	5	1.85	996.
3	1.03	.267E+04			

***** CHANNEL DEPTHS (FT) *****

CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE
1	.21	5.00	4	1.44	2.68
2	.62	3.32	5	1.85	2.18
3	1.03	3.00			

***** CHANNEL VELOCITIES (FT/SEC) *****

CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE
1	.21	.972E-01	4	1.44	.324E-01
2	.62	.756E-01	5	1.85	.108E-01
3	1.03	.540E-01			

***** JUNCTION VOLUMES (CUFT) *****

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	.227E+08	4	1.24	.480E+07
2	.41	.164E+08	5	1.65	.299E+07
3	.82	.802E+07	6	2.06	.217E+07

***** COMPUTED REAERATION RATES (1/DAY) *****

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	.425	4	1.24	.685
2	.41	.565	5	1.65	.586
3	.82	.710	6	2.06	.516

***** STEADY STATE FLOW CONDITIONS *****

TOTAL INFLOWS = .2
**** TOTAL DIVERSIONS = .0
**** OUTFLOW AT DOWNSTREAM JUNCTION = .2

**** INFLOWS (CFS) *****

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	.000	4	1.24	.770E-01
2	.41	.600E-02	5	1.65	.000
3	.82	.180E-01	6	2.06	.500E-01

**** DIVERSIONS (CFS) *****

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	.151	4	1.24	.000
2	.41	.000	5	1.65	.000
3	.82	.000	6	2.06	.000

**** CHANNEL FLOWS (CFS) *****

CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE
1	.21	-.151	4	1.44	-.500E-01
2	.62	-.145	5	1.85	-.500E-01
3	1.03	-.127			

****
****
**** *****
**** STEADY STATE CBOD INPUT CONCENTRATIONS (PPM) *****
**** *****
****
****

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	.000	4	1.24	60.0
2	.41	.415	5	1.65	.000
3	.82	.365	6	2.06	90.0

ONVERGENCE IN 21 CYCLES

arter's Creek

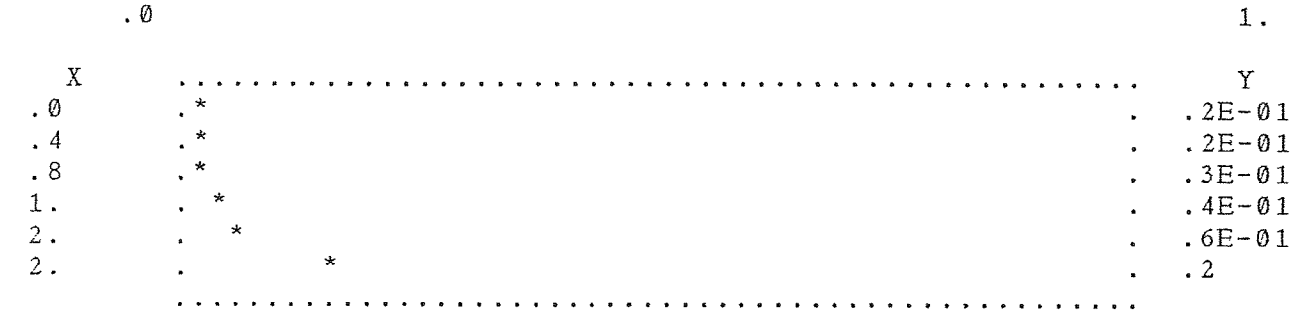
**** STEADY STATE CBOD CONCENTRATION *****

**** OUTFLOW AT DOWNSTREAM END= .15 *****

CONCENTRATIONS (PPM)

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	.215E-01	4	1.24	.437E-01
2	.41	.219E-01	5	1.65	.615E-01
3	.82	.276E-01	6	2.06	.171

=RIVER MILE Y= CBOD CONCENTRATIONS (PPM)



****
****
**** *****
**** STEADY STATE NBOD INPUT CONCENTRATIONS (PPM) *****
**** *****
****
****

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	.000	4	1.24	2.60
2	.41	.000	5	1.65	.000
3	.82	.000	6	2.06	.000

ONVERGENCE IN 1 CYCLES

arter's Creek

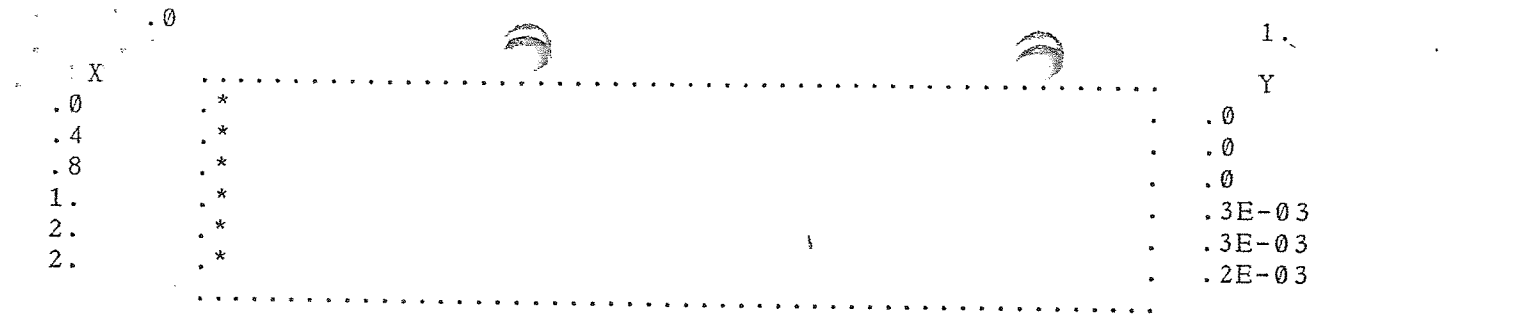
**** STEADY STATE NBOD CONCENTRATION *****

**** OUTFLOW AT DOWNSTREAM END= .15 *****

CONCENTRATIONS (PPM)

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	.000	4	1.24	.329E-03
2	.41	.000	5	1.65	.270E-03
3	.82	.000	6	2.06	.241E-03

=RIVER MILE Y= NBOD CONCENTRATIONS (PPM)



****
****
*****
*****
*****
*****
****
****

STEADY STATE DO INPUT CONCENTRATIONS (PPM)

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	.000	4	1.24	5.79
2	.41	.000	5	1.65	.000
3	.82	.000	6	2.06	.000

***** FIXED JUNCTIONS *****

**** JUNCTION 1 RIVER MILE .00 IS FIXED AT 5.2000 (PPM)

ONVERGENCE IN 14 CYCLES

arter's Creek

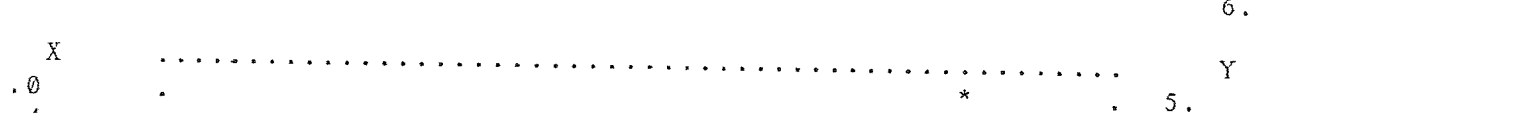
**** STEADY STATE DO CONCENTRATION *****

**** OUTFLOW AT DOWNSTREAM END= .15 *****

CONCENTRATIONS (PPM)

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	5.20	4	1.24	5.68
2	.41	5.34	5	1.65	5.73
3	.82	5.53	6	2.06	5.59

RIVER MILE Y= DO CONCENTRATIONS (PPM)



1. . * . 6.
2. : * : 6:
2. . . . . .

```
arter's Creek
     .000       2.060       2.060          5
ATA
IDTH            6
    1             .000    3494.000
    2             .340    1165.000
    3             .530    1941.000
    4             .660    1165.000
    5            1.180     776.500
    6            2.000     388.200
ISP             2
    1            2.060        .000
    2             .000     701.959
ELO             2
    1            2.060        .000
    2             .000        .108
EMP             2
    1             .190      27.000
    2            1.060      29.000
EDI             1
    1            1.030       1.500
DECAY           1
    1            1.030        .150
DECAY           1
    1            1.030        .075
3               6
    1             .000       5.000
    2             .340       5.000
    3             .530       4.000
    4             .660       3.000
    5            1.180       3.000
    6            2.000       2.000
-SATDO
-REAER
TOP
LOW
                  .340        .006
                  .660        .009
                  .960        .009
                 1.180        .077
                 2.000        .050
TOP
BOD
                  .340        .006        .415
                  .660        .009        .375
                  .960        .009        .355
                 1.180        .077      60.000
                 2.000        .050      90.000
TOP
BOD
                  .340        .006       7.500
                  .660        .009       7.500
                  .960        .009       7.500
                 1.180        .077     125.000   25 mg/L TKN -
TOP
)
                  .190        .000       5.200
                 1.060        .077       5.790
XED               .190                              5.200
TOP
ALT
```

- tideNBOD.dat to check sensitivity of model to NBOD at Tides Inn -

* To modify model dataset, program asks for NBOD instead of TKN, which is requested when data is first input. Assumption is made that 1 mg N ≈ 5 mg O_2 and TKN values are multiplied by 5 for input as NBOD -

difference between DO concentrations for tideMDL.out and tideNBOD.out is a 0.01 mg/L DO decrease at junctions 5 + 6 -

Carter's Creek Model with other discharges

Mcalc	RM	width	depth	temp
ight 0.0		0.66mi x 5280 ft/mi = (3494)	5 ft	90% 26 x 1.627
3cm x 0.8cm = 0.34		1.5cm/6.8 = 0.22mi x 5280 ft/mi = (1165)	5	27
6cm x 1mi/6.8 = 0.53		2.5cm/6.8 = 0.37 x 5280 = (1941)	4	27
.5cm x 1mi/6.8 = 0.66		1.5cm (1165)	3	29
.18RM	Discharge	1.0cm = 776.5	3	29
2.0		0.5cm 388.2 ft	2ft	29

BOD points

BOD		Q	RM
166	Oysterworld ~~.0327 MGD~~ x 1.547 cfs/MGD = .00619		0.34
150	CWF Morgan	.00619	0.66
	Stingray Pt	.002 x 1.547 + .00309 = .00928	
142	Barnack + Reynolds	.006, .00928	0.90
124	Tides Inn	.07659 cfs	1.18
136	Tides Lodge	.0325 MGD x 1.547 = .0503 cfs	2.0

tidl 5.dat

also Modify Qs.
TKN pts Morgan + Yeocomico NH3 ~ 150 TKN: 1.5
insert for ~~all~~ Oyster, use 3.6 for TL.

**** R E G I O N A L M O D E L I N G S Y S T E M *****

**** FEATURING *****

**** A U T O $ $ W A T E R Q U A L I T Y M O D E L *****

**** STEADY STATE WATER QUALITY MODEL *****
**** RUN TITLE .....Carter's Creek

**** BASIC NETWORK DATA *****
**** RIVER MILE OF DOWNSTREAM END... .00
**** RIVER MILE OF UPSTREAM END..... 2.06
**** RIVER MILE OF FALL LINE..... 2.06
**** NUMBER OF SECTIONS..... 5

****
****
**** *****
**** E S T U A R Y / S T R E A M I N P U T D A T A *****
**** *****
****
****

**** CHANNEL WIDTHS (FT) *****

CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE
1	.21	.208E+04	4	1.44	652.
2	.62	.142E+04	5	1.85	457.
3	1.03	889.			

**** JUNCTION SURFACE AREAS (SQFT) *****

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	.453E+07	4	1.24	.168E+07
2	.41	.381E+07	5	1.65	.121E+07
3	.82	.251E+07	6	2.06	.995E+06

**** DISPERSION COEFFICIENTS (SQFT/SEC) *****

CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE
1	.21	632.	4	1.44	211.
2	.62	491.	5	1.85	70.2

**** AVERAGE CHANNEL TIDAL VELOCITIES (FT/SEC) *****

CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE
1	.21	.972E-01	4	1.44	.324E-01
2	.62	.756E-01	5	1.85	.108E-01
3	1.03	.540E-01			

**** JUNCTION WATER TEMPERATURES (DEG-C) **** *

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	27.0	4	1.24	29.0
2	.41	27.5	5	1.65	29.0
3	.82	28.5	6	2.06	29.0

**** OXYGEN UPTAKE OF SEDIMENTS (GM O2/SQM/DAY) *****

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	1.50	4	1.24	1.50
2	.41	1.50	5	1.65	1.50
3	.82	1.50	6	2.06	1.50

**** CBOD DECAY RATES CORRECTED TO STREAM TEMP - (1/DAY) *****

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	.207	4	1.24	.227
2	.41	.212	5	1.65	.227
3	.82	.221	6	2.06	.227

**** NBOD DECAY RATES CORRECTED TO STREAM TEMP - (1/DAY) *****

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	.129	4	1.24	.150
2	.41	.134	5	1.65	.150
3	.82	.144	6	2.06	.150

**** A3 COEFFICIENT FOR FLOW EQUATION *****
** REPRESENTS DEPTH OF FLOW IF A1 AND/OR A2 ARE ZERO ***

CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE
1	.21	5.00	4	1.44	2.68
2	.62	3.32	5	1.85	2.18
3	1.03	3.00			

**** COMPUTED OXYGEN SATURATION CONCENTRATIONS (PPM) *****

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE

1	.00	9.61	4	1.24	9.73
2	.41	9.63	5	1.65	9.73
3	.82	9.69	6	2.06	9.73

****
****
**** *****
**** DEPTH OR VELOCITY DEPENDENT VARIABLES *****
**** *****
****
****

***** CROSS-SECTIONAL AREAS OF CHANNELS (SQFT) *****

CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE
1	.21	.104E+05	4	1.44	.175E+04
2	.62	.470E+04	5	1.85	996.
3	1.03	.267E+04			

**** CHANNEL DEPTHS (FT) *****

CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE
1	.21	5.00	4	1.44	2.68
2	.62	3.32	5	1.85	2.18
3	1.03	3.00			

**** CHANNEL VELOCITIES (FT/SEC) *****

CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE
1	.21	.972E-01	4	1.44	.324E-01
2	.62	.756E-01	5	1.85	.108E-01
3	1.03	.540E-01			

**** JUNCTION VOLUMES (CUFT) *****

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	.227E+08	4	1.24	.480E+07
2	.41	.164E+08	5	1.65	.299E+07
3	.82	.802E+07	6	2.06	.217E+07

**** COMPUTED REAERATION RATES (1/DAY) *****

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	.425	4	1.24	.685
2	.41	.565	5	1.65	.586
3	.82	.710	6	2.06	.516

*** STEADY STATE FLOW CONDITIONS *****
*** TOTAL INFLOWS = .2

**** TOTAL DIVERSIONS = .0
**** OUTFLOW AT DOWNSTREAM JUNCTION = 2

**** INFLOWS (CFS) *****

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	.000	4	1.24	.770E-01
2	.41	.600E-02	5	1.65	.000
3	.82	.180E-01	6	2.06	.500E-01

**** DIVERSIONS (CFS) *****

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	.151	4	1.24	.000
2	.41	.000	5	1.65	.000
3	.82	.000	6	2.06	.000

**** CHANNEL FLOWS (CFS) *****

CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE
1	.21	-.151	4	1.44	-.500E-01
2	.62	-.145	5	1.85	-.500E-01
3	1.03	-.127			

****
****
**** *****
**** STEADY STATE CBOD INPUT CONCENTRATIONS (PPM) ****
**** *****
****
****

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	.000	4	1.24	60.0
2	.41	.415	5	1.65	.000
3	.82	.365	6	2.06	90.0

ONVERGENCE IN 21 CYCLES

arter's Creek

**** STEADY STATE CBOD CONCENTRATION *****

**** OUTFLOW AT DOWNSTREAM END= .15 *****

CONCENTRATIONS (PPM)

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	.215E-01	4	1.24	.437E-01
2	.41	.219E-01	5	1.65	.615E-01
3	.82	.276E-01	6	2.06	.171

=RIVER MILE Y= CBOD CONCENTRATIONS (PPM)

```
      .0                                                        1.
   X  ..........................................................  Y
 .0   .*                                                      .  .2E-01
 .4   .*                                                      .  .2E-01
 .8   .*                                                      .  .3E-01
 1.   .  *                                                    .  .4E-01
 2.   .    *                                                 .  .6E-01
 2.   .        *                                             .  .2
      ..........................................................
```

****
****
**** *****
**** STEADY STATE NBOD INPUT CONCENTRATIONS (PPM) *****
**** *****
****
****

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	.000	4	1.24	125.
2	.41	7.50	5	1.65	.000
3	.82	7.50	6	2.06	.000

ONVERGENCE IN 40 CYCLES

arter's Creek

**** STEADY STATE NBOD CONCENTRATION *****

**** OUTFLOW AT DOWNSTREAM END= .15 *****

CONCENTRATIONS (PPM)

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	.525E-01	4	1.24	.787E-01
2	.41	.531E-01	5	1.65	.747E-01
3	.82	.597E-01	6	06	.668E-01

=RIVER MILE Y= NBOD CONCENTRATIONS (PPM)

```
   X     ..........................................................     Y
 .0      .  *                                                    .   .5E-01
 .4      .  *                                                    .   .5E-01
 .8      .  *                                                    .   .6E-01
 1.      .   *                                                   .   .8E-01
 2.      .   *                                                   .   .7E-01
 2.      .   *                                                   .   .7E-01
         ..........................................................
```

****
****
**** *****
**** STEADY STATE DO INPUT CONCENTRATIONS (PPM) *****
**** *****
****
****

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	.000	4	1.24	5.79
2	.41	.000	5	1.65	.000
3	.82	.000	6	2.06	.000

**** FIXED JUNCTIONS *****

**** JUNCTION 1 RIVER MILE .00 IS FIXED AT 5.2000 (PPM)

ONVERGENCE IN 14 CYCLES

arter's Creek

**** STEADY STATE DO CONCENTRATION *****

**** OUTFLOW AT DOWNSTREAM END= .15 *****

CONCENTRATIONS (PPM)

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	.00	5.20	4	1.24	5.68
2	.41	5.34	5	1.65	5.72
3	.82	5.53	6	2.06	5.58

=RIVER MILE Y= DO CONCENTRATIONS (PPM)

```
      .0                                                          6.

   X     ..........................................................     Y
 .0      .                                                  *    .   5.
 .4      .                                                  *    .   5
```

Stream Sanitation Analysis

Mosca,Denise

From: Palmore,Jennifer
Sent: Tuesday, April 06, 2004 11:12 AM
To: Mosca,Denise
Cc: Brockenbrough,Allan
Subject: RE: Tides North models

Allan and I had talked last week that we had both rerun it with Dr. Kuo's suggestions and it didn't work. The plan was for me to take the simplest version (Totuskey) and try that and if not send it to Dr. Kuo. I think it will be a while before we get a resolution, so if Allan agreed to limits, I would use those so that you can get the permit out.

-----Original Message-----
From: Mosca,Denise
Sent: Tuesday, April 06, 2004 7:42 AM
To: Palmore,Jennifer
Subject: FW: Tides North models

I guess he's talking about 10-10-3...but you'll still run the model.
Denise

Denise M. Mosca
Environmental Specialist II
DEQ-Piedmont Regional Office
4949-A Cox Road
Glen Allen, Va. 23060
804-527-5027
fax 804-527-5106

-----Original Message-----
From: Brockenbrough,Allan
Sent: Monday, April 05, 2004 3:02 PM
To: Mosca,Denise
Subject: RE: Tides North models

I just reviewed the pictures of the outfall with Jon and we both agreed that they should get end-of-pipe limits for that outfall - both for the current discharge and the proposed expansion. As far as the BOD, etc., last I spoke with Jennifer I believe she was going to try to rerun the tidal model using a few suggestions made by Dr. Kuo. If they don't work, we will go back to him to try to further debug the program. Give me a call if we need to discuss.

Allan

-----Original Message-----
From: Mosca,Denise
Sent: Friday, April 02, 2004 10:51 AM
To: Brockenbrough,Allan
Subject: Tides North models

Hi, what can I tell the consultant looking for the status of the limits for this project?
thanks,
Denise

Mosca,Denise

From: Brockenbrough,Allan
Sent: Thursday, April 22, 2004 9:58 AM
To: Mosca,Denise
Cc: Palmore,Jennifer
Subject: RE: Tides Lodge

Hey Denise-

Sorry for the delay in getting back to you. By definition, the wla multipliers are all 1 for "end-of-pipe" limits. No dilution is available. For a Tier 2 water you are going to get wla's equal to 1/4 the water quality criteria. They really need to construct a submerged diffuser in deeper water to get any kind of reasonable mixing. Give me a call if we need to discuss further.

Allan

-----Original Message-----
From: Mosca,Denise
Sent: Friday, April 16, 2004 11:44 AM
To: Brockenbrough,Allan
Cc: Palmore,Jennifer
Subject: Tides Lodge

Hi, I proceeded with end of pipe limits for this facility as you recommended. We went around on a tier designation for the Tides Lodge discharge location and settled on Tier 2. I need to run mstranti for the baselines and attach it in my fact sheet to satisfy antidegradation. I'll still need multipliers from you then for the WLAs.
Denise

Attachment J

Stream Monitoring Program Memo

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Piedmont Regional Office

4949-A Cox Road, Glen Allen, VA 23060-6296 **804/527-5020**

SUBJECT: Stream Monitoring Program
Tides Utilities LLC. North WWTP – VA0029343

TO: Drew Hammond, P.E.

FROM: Jennifer Palmore, P.G.

DATE: January 26, 2011
REVISED: March 28, 2011

COPIES: File

The Tides Utilities North Wastewater Treatment Plant discharges to a tributary of Church Prong (a tributary of Carters Creek), near Christchurch, VA. The outfall is located at rivermile 3-XHZ000.20.

The Tides North WWTP has a current design flow of 0.0325 MGD; however the permit has three flow tiers and allows expansion to 0.040 MGD and 0.100 MGD. The current monthly limit for BOD_5 is 24 mg/L and for ammonia is 1.15 mg/L at the 0.0325 MGD flow tier. During the 2005 reissuance, the DEQ attempted to model the stream in order to develop limits for the 0.040 and 0.100 MGD flow tiers. Due to difficulties with the modeling effort and the fact that the tributary is a shallow cove with limited mixing, the facility was assigned self-sustaining permit limits of $cBOD_5$ = 10 mg/L, TSS = 10.0 mg/L, and TKN = 3.0 mg/L for both expanded flows. To confirm that water quality standards are being met in the cove at the current design flow and limits, the DEQ required the facility to undertake an instream monitoring program.

The facility has sampled monthly at two locations on the receiving stream – station 1 near the outfall in the cove and station 2 at the mouth of the tributary on Church Prong. A map of the monitoring locations is attached. Samples were collected during slack high tide and were analyzed for pH, temperature, dissolved oxygen, salinity, and ammonia.

The DEQ is currently processing a permit reissuance application; therefore a request to review the instream monitoring data for the tributary was received on December 15, 2010. This analysis addresses data collected from October 2006 through November 2010.

I analyzed the data using a one-tailed paired two sample t-test. Based on a p value of 0.05, the results indicated the following:

- Station 2 at the mouth of the tributary has lower dissolved oxygen than Station 1 near the outfall
- Station 2 has higher salinity than Station 1
- Temperature and pH are not significantly different at the two stations
- Ammonia was only detected on one date (11/10/10); therefore a t-test could not be performed

The data show no violations of the pH Water Quality Standard of 6.0-9.0 SU or the ammonia standard. There is no maximum temperature Water Quality Standard in estuarine waters, however there is a standard for maximum 3°C rise above background temperature. The maximum temperature difference between the two stations was 2.1°C. In addition, the two stations show no significant difference in means, as stated above, and the population means at both stations are similar to the historical record at

monitoring station 3-CTR000.76 and less than the mean at station 3-CTR001.06, which are both located on Carters Creek. Therefore, the monitoring data does not indicate a violation of the maximum temperature rise standard.

The receiving stream is impaired for the Aquatic Life Use due to failure of the Chesapeake Bay standards in the Rappahannock Mesohaline estuary. The segment violates the 30-day mean summer dissolved oxygen criteria and has inadequate submerged aquatic vegetation (SAV). The instream monitoring program confirms that the dissolved oxygen within the cove periodically falls below the 30-day mean standard. Of the 48 monthly samples, dissolved oxygen was below 5 mg/L three times at Station 1 (cove) and six times at Station 2 (mouth).

Since the samples were collected at slack high tide and Station 2 had lower dissolved oxygen than Station 1, I believe that the dissolved oxygen violations were more influenced by incoming water from Church Prong than by the discharge. This is confirmed by the higher mean salinity at Station 2 than Station 1. In addition, both stations had higher dissolved oxygen means than both ambient monitoring stations 3-CTR000.76 and 3-CTR001.06 on Carters Creek.

I believe there is insufficient evidence to indicate that the facility is causing the dissolved oxygen violations on the tributary and Church Prong. However, I recommend that the permit include a dissolved oxygen limit of 6.0 mg/L to ensure that the permit does not exacerbate the existing dissolved oxygen impairment.

If you have any questions, please do not hesitate to contact me.

VEGIS Map Export

Legend

DEQ Central & Regional Offices

- DEQ Central Office, 629 East Main Street, Richmond, VA 23219
- 1 South West Regional Office, 355 Deadmore St SE, Abingdon, VA 24210
- 2 Blue Ridge Regional Office, 3019 Peters Creek Road NW, Roanoke, VA 24019
- 2 Blue Ridge Regional Office, 7705 Timberlake Road, Lynchburg, VA 24502
- 3 Northern Virginia Regional Office, 13901 Crown Court, Woodbridge, VA 22193
- 4 Piedmont Regional Office, 4949-A Cox Road, Glen Allen, VA 23060
- 5 Tidewater Regional Office, 5636 Southern Blvd, Virginia Beach, VA 23462
- 6 Valley Regional Office, 4411 Early Road, Harrisonburg, VA 22801

DEQ Regional Boundaires

Title: The Tides Utilities, LLC - North WWTP **Date: 3/21/2011**

Feet

0 100 200 300 400

1:4,800 / 1"=400 Feet

Attachment K

Effluent Dissolved Oxygen Monitoring Results

Facility Name: The Tides Utilities, LLC North WWTP
Permit No: VA0029343
Outfall: 001

Date	Dissolved Oxygen
	mg/L
6/1/11	**5.09**
6/2/11	**5.11**
6/3/11	6.08
6/4/11	**5.39**
6/5/11	6.5
6/6/11	6.0
6/7/11	6.2
6/8/11	6.0
6/9/11	**5.2**
6/11/11	6.0
6/12/11	6.3
6/13/11	**5.9**
6/14/11	6.5
6/15/11	6.84
6/16/11	6.04
6/17/11	7.1
6/18/11	6.86
6/19/11	**5.85**
6/20/11	6.0
6/21/11	6.49
6/22/11	6.3
6/23/11	6.28
6/24/11	**5.8**
6/25/11	6.11
6/26/11	6.3
6/27/11	6.1
6/28/11	**5.9**
6/29/11	6.03
6/30/11	6.3
Min.	5.09
Avg.	6.1
Max.	7.1

Attachment L

Dispensation of Requests for a Public Hearing Memo

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Piedmont Regional Office

4949–A Cox Road **Glen Allen, Virginia 23060** **(804) 527-5020**

TO: Michael P. Murphy, PRO Regional Director

FROM: Andrew J. Hammond II, Water Permit Writer
via Curtis J. Linderman, Water Permit Manager

DATE: January 17, 2012

SUBJECT: Dispensation of Requests for a Public Hearing
VPDES Permit No. VA0029343
The Tides Utilities LLC North Wastewater Treatment Plant
Lancaster County, Virginia

COPIES: Kyle I. Winter, PRO Deputy Regional Director

BACKGROUND

On June 3, 2010, the Virginia Department of Environmental Quality (DEQ) received an application from The Tides Utilities LLC for reissuance of Virginia Pollutant Discharge Elimination System (VPDES) permit number VA0029343 for the privately owned The Tides Utilities LLC North Wastewater Treatment Plant located in Lancaster County, Virginia. The Virginia Department of Health (VDH) Office of Drinking Water and VDH Division of Shellfish Sanitation reviewed the permit application and had no objections. The most recent permit was reissued on November 3, 2005. The permit is classified as a minor municipal permit.

The applicant proposes to continue the release of treated sewage wastewaters at a rate of 32,500 gallons per day (with a proposed future expansion to 100,000 gallons per day) into an unnamed tributary of Church Prong in the Rappahannock River watershed. The existing activated sludge wastewater treatment plant serves an approximate population of 517 users. The Preliminary Engineering Report (PER) for the proposed activated sludge wastewater treatment plant was approved by DEQ on September 19, 2007, and will encompass a larger service area. This facility is subject to the requirements of 9VAC25-820 and has registered for coverage under the General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia.

All limitations and/or conditions in the proposed draft permit are the same or more stringent than those contained in the 2005 permit, with minor updates to reflect current agency permit protocols. These updates include additional significant figures requirements, increased fecal coliform monitoring and reporting requirements, an additional Dissolved Oxygen limitation with compliance schedule, an additional *Enterococci* limitation, Dissolved Sulfide monitoring and reporting, and several revisions to special condition boilerplate language. Limitations and monitoring requirements associated with a 40,000 gallon per day expansion tier were removed from the proposed draft permit at the request of the permittee.

For the existing 32,500 gallon per day facility, reasonable potential analyses and effluent limitation development were undertaken to ensure Water Quality Standards were met with the benefit of in-stream dilution. The draft permit proposes to limit the following parameters:

pH	6.0 s.u minimum; 9.0 s.u. maximum
5-day Biochemical Oxygen Demand	24 mg/L (2900 g/d) monthly average
	36 mg/L (4400 g/d) weekly average
Total Suspended Solids	24 mg/L (2900 g/d) monthly average
	36 mg/L (4400 g/d) weekly average
Total Residual Chlorine	1.4 µg/L monthly average; 1.7 µg/L weekly average
Fecal Coliform	200 N/100 mL monthly geometric mean
Dissolved Oxygen	6.0 mg/L minimum
Ammonia as Nitrogen	1.15 mg/L monthly average; 1.15 mg/L weekly average
Enterococci	35 N/100 mL monthly geometric mean

For the proposed 100,000 gallon per day facility, reasonable potential analyses and effluent limitation development were undertaken to ensure Water Quality Standards were met "end-of-pipe" (i.e. without the benefit of in-stream dilution). The draft permit proposes to limit the following parameters:

pH	6.0 s.u minimum; 9.0 s.u. maximum
Total Suspended Solids	10 mg/L (3800 g/d) monthly average
	15 mg/L (5700 g/d) weekly average
Total Residual Chlorine	1.3 µg/L monthly average; 1.4 µg/L weekly average
Fecal Coliform	200 N/100 mL monthly geometric mean
Dissolved Oxygen	6.0 mg/L minimum
Ammonia as Nitrogen	0.02 mg/L monthly average; 0.03 mg/L weekly average
Enterococci	35 N/100 mL monthly geometric mean
5-day carbonaceous Biochemical	10 mg/L (3800 g/d) monthly average
Oxygen Demand	15 mg/L (5700 g/d) weekly average
Total Nitrogen	3.0 mg/L calendar year average
Total Phosphorus	0.30 mg/L calendar year average

The Water Resources Development Staff has indicated that the proposed draft permit is in conformance with the existing planning documents for the area.

PUBLIC NOTICE

The draft permit was public noticed in the *Rappahannock Record* on December 8, 2011 and December 15, 2011. Copies of the proposed draft permit and fact sheet are attached.

PUBLIC COMMENTS

The public comment period began on December 8, 2011, and ended at 11:59 p.m. on January 9, 2012. During the 30-day public comment period, five (5) comments representing seven (7) individuals and one (1) homeowners' association (The Green Association) were received. Of these comments, two (2) were submitted in full compliance with the information requirements outlined in 9VAC25-230-40 of Procedural Rule No. 1.

SUMMARY OF COMMENTS RECEIVED DURING THE PUBLIC NOTICE PERIOD

Issue: Will holding a public hearing be beneficial to the public and/or community?

Comment: Three (3) requests for a public hearing were received in order to provide a further understanding of the existing sewage situation, intent, scope, specific location, options considered, results of prior environmental studies, and facility connection access.

Commenter(s): Rich McClain, J. Lance Franke, Stephanie S. Chaufournier

Staff Response: *It is DEQ's obligation to evaluate permit applications it receives in order to determine the impact to State waters in accordance with the Virginia Water Quality Standards (9VAC25-260), and to assign effluent limitations to a facility in order to maintain these standards. In accordance with agency policy and guidance, permit development supporting documentation has been included in and/or attached to the proposed fact sheet. Permit application data is on file at the Piedmont Regional Office and is available for public review.*

DEQ staff recommends that no change to the proposed permit is necessary in response to these comments.

Issue: Will the reissuance of VPDES permit VA0029343 negatively impact the water quality in Carter's Creek and the Chesapeake Bay? Will human health be adversely impacted?

Comment: "We are greatly concerned about the environmental impact on Carter's Creek. The fragility of the already damaged Chesapeake Bay will be further negatively affected by this action. As residents living on Carters Creek, we are worried about not only the environmental issues, but also the health issues."

Commenter(s): Edward J. and Pauline B. Sulick

Staff Response: *It is DEQ's obligation to evaluate permit applications it receives in order to determine the impact to State waters in accordance with the Virginia Water Quality Standards (9VAC25-260), and to assign effluent limitations to a facility in order to maintain these standards. The Virginia Water Quality Standards include numerical water quality criteria (9VAC25-260-140) developed to protect aquatic life and human health. These criteria are applicable to Carter's Creek and the Chesapeake Bay. The proposed permit was prepared in accordance with all applicable statues, regulations, and agency practices; the effluent limitations and conditions in the proposed permit have been established to maintain all applicable water quality standards. The Water Resources Development Staff has reviewed the proposed permit and indicated that it is in conformance with the existing planning documents for the area, including the recently approved Chesapeake Bay Total Maximum Daily Load.*

DEQ staff recommends that no change to the proposed permit is necessary in response to these comments.

Issue: Will the reissuance of VPDES permit VA0029343 require compliance with the applicable reliability classification?

Comment: Concerns were expressed regarding the permittee's (wastewater treatment plant and sewage collection system) compliance with the applicable reliability class.

Commenter(s): Bruce and Pat Julian, J. Lance Franke, Stephanie S. Chaufournier

Staff Response: *Part I.C.6 of the proposed permit requires the permitted treatment works to meet Reliability Class I as defined in the Virginia Sewage Collection and Treatment Regulations (9VAC25-790). Additionally, the Virginia Pollutant Discharge Elimination System Permit Regulation defines treatment works as "any devices and systems used for the storage, treatment, recycling or reclamation of sewage or liquid industrial waste, or other waste or necessary to recycle or reuse water, including intercepting sewers, outfall sewers, sewage collection systems, individual systems, pumping, power and other equipment and their appurtenances; extensions, improvements, remodeling, additions, or alterations thereof; and any works, including land that will be an integral part of the treatment process or is used for ultimate disposal of residues resulting from such treatment; or any other method or system used for preventing, abating, reducing, storing, treating, separating, or disposing of municipal waste or industrial waste, including waste in combined sewer water and sanitary sewer systems." DEQ conducts both routine and risk-based inspections of facilities to verify compliance with permit conditions. The routine*

DEQ inspection schedule for minor municipal VPDES facilities is a minimum of once every five (5) years. No defensible evidence has been presented to DEQ staff to question the treatment works ability to comply with Reliability Class I.

DEQ staff recommends that no change to the proposed permit is necessary in response to these comments.

Issue: Should additional connections to the privately-owned sewage collection system be evaluated and/or pursued?

Comment: Concerns were expressed regarding the connection availability of the sewage collection system for private residences utilizing adequate and/or failing on-site septic systems, as well as connection availability proffers established between the permittee and Lancaster County Board of Supervisors.

Commenter(s): Bruce and Pat Julian, J. Lance Franke, Stephanie S. Chaufournier

Staff Response: *It is DEQ's obligation to evaluate permit applications it receives in order to determine the impact to State waters in accordance with the Virginia Water Quality Standards (9VAC25-260), and to assign effluent limitations to a facility in order to maintain these standards. Connection availability of the sewage collection system is at the discretion of the conveyance system's owner and therefore, is not within DEQ staff's jurisdiction to consider as a basis to re-issue, modify, or deny the proposed permit. Additionally, proffers established between permittees and local governing bodies are not within DEQ staff's jurisdiction to consider as a basis to re-issue, modify, or deny the proposed permit.*

Concerns regarding failing septic systems should be addressed to the Lancaster County Health Department.

DEQ staff recommends that no change to the proposed permit is necessary in response to these comments.

LIST OF COMMENTERS (Copies of all comments are attached)

Rich McClain
Edward J. Sulick
Pauline B. Sulick
Allan Young, President, The Green Association
Bruce Julian
Pat Julian
J. Lance Franke
Stephanie S. Chaufournier

CRITERIA FOR DISPENSING REQUESTS FOR PUBLIC HEARING

§62.1-44.15:02.C of the *Code of Virginia* and 9VAC25-230-50.A of Procedural Rule No. 1 states that for a public hearing to be granted: a) there must be significant public interest; b) there are substantial, disputed issues relevant to the issuance of the permit in question; and c) the action requested is not on its face inconsistent with, or in violation of, the State Water Control Law, federal law or any regulation promulgated thereunder. §62.1-44.15:02.C.1 of the *Code* further defines significant public interest as evidenced by the receipt of a minimum of 25 individual requests for public hearing or Board consideration.

STAFF RECOMMENDATIONS

Staff finds the number of individual requests for public hearing received does not meet the statutory requirements of significant public interest to qualify for convening a public hearing for the VPDES reissuance of permit VA0029343, The Tides Utilities LLC North Wastewater Treatment Plant. In addition, DEQ staff finds the proposed VPDES discharge permit VA0029343 to have been prepared in accordance with all applicable statutes, regulations and agency practices; the effluent limits and conditions in the permit have been adequately established to protect in-stream beneficial uses, fish and wildlife resources, and to maintain all applicable water quality standards; and all public comments relevant to the permit have been considered. It is recommended the reissuance of VPDES permit VA0029343 be approved as public noticed.

STAFF CONTACT

Andrew Hammond
DEQ Piedmont Regional Office
4949-A Cox Road
Glen Allen, Virginia 23060
Ph: 804-527-5048
Fx: 804-527-5106
Andrew.Hammond@deq.virginia.gov

APPROVED: _____
Michael P. Murphy
PRO Regional Director

DATE: 1-18-2012

Hammond, Andrew (DEQ)

From: Rich McClain [rmcclain@mcclaingroupii.com]
Sent: Thursday, December 15, 2011 11:02 PM
To: Hammond, Andrew (DEQ)
Subject: Official Request for Hearing - The Tides Utilities LLC permit to disharge treated sewage wastewaters into Church Prong of Carters Creek

Mr. Hammond,

I own a home on Carters Creek, Church Prong, at the address 507 Glebe Road, Irvington, VA 22480.

I understand that the subject permit has been filed, and hereby request a hearing to understand the current sewage situation, as well as the intent, scope, specific location, options considered, results of prior environmental studies, etc. associated with the recent permit application in order to decide how to approach such an operation.

Please send me a copy of the application for permit (reply this email or mail hardcopy to address below), and let me know how I can stay informed of all hearings that are scheduled.

Rich McClain

"Bringing Business and Technology Together" tm
www.mcclaingroupii.com

McClain Group II
One Monument Avenue
Suite 5A
Richmond, VA 23220
Office Phone: (804) 357-5845
rmcclain@mcclaingroupii.com

Hammond, Andrew (DEQ)

From: Pauline B. Sulick [pbsulick@gmail.com]
Sent: Friday, December 16, 2011 8:58 AM
To: Hammond, Andrew (DEQ)
Subject: Tide Inn Release of Wastewater

Dear Mr. Hammond,

After reading the public notice in the Rappahannock Record, we are requesting a public hearing concerning the release of wastewater by the Tides Inn into Church Prong. We are greatly concerned about the environmental impact on Carter's Creek. The fragility of the already damaged Chesapeake Bay will be further negatively affected by this action. As residents living on Carters Creek, we are worried about not only the environmental issues, but also the health issues.

Sincerely.

Edward J. and Pauline B. Sulick
527 Glebe Road
Irvington, Va 22480
804-438-5907

December 30, 2011

Andrew J. Hammond II, P.E.
Water Permits Writer
Dept. of Environmental Quality
Piedmont Regional Office
4949-A Cox Road
Glen Allen, VA 23060

RE: VPDES Permit Number VA0029343 – Tides Utilities North Wastewater Treatment Plant, the Tides Utilities, LLC

Dear Mr. Hammond:

The Green Association represents twenty four residences and their respective owners in an area of Lancaster County, Virginia known as The Green adjacent to the former Tides Lodge and the former Tartan Golf Course. All the residences in The Green are served by the above referenced wastewater treatment plant owned and operated by the Tides Utilities, LLC. At the present time, wastewater from the residences at The Green comprise more than fifty percent of the total load of wastewater being treated at the subject plant.

The Board of Directors of The Green Association has reviewed the application of the Tides Utilities, LLC for the re-issuance of the above referenced permit and this is to advise you that The Green Association strongly supports approval of the re-issuance of the permit for the Tides Utilities North Wastewater Treatment Plant.

Please do not hesitate to contact the me if you have any questions regarding this letter of support for the re-issuance of the permit or if you need any additional information concerning this matter from The Green Association.

Very truly yours,

Allan Young, President
The Green Association
P.O. Box 218
Irvington, VA 22480

Phone: (804) 438-5317
allanyoung@verizon.net

Hammond, Andrew (DEQ)

From: Bruce Julian [bruce_julian@hotmail.com]
Sent: Friday, January 06, 2012 10:21 AM
To: Hammond, Andrew (DEQ)
Subject: RE: VPDES Permit Number VA0029343 - Tides Utilities North Wastewater Treatment Plant
Attachments: Letter of Comment-Final-Jan 2012.docx

Drew--

Attached are our comments regarding the above subject permit--

Thank you for your assistance.

Please acknowledge receipt.

Bruce & Pat Julian

January 6, 2012

Andrew J. Hammond II, P.E.
Water Permit Writer
Dept. of Environmental Quality
Piedmont Regional Office
4949-A Cox Road
Glen Allen, VA 23060

Dear Mr. Hammond;

Re: VPDES Permit Number VA0029343 - Tides Utilities North Wastewater Treatment Plant, the Tides Utilities, LLC

We **support approval** of the subject permit reissuance. Additionally, we fully support the goals articulated in DEQ's strategic plan to: "*Achieve focused, more efficient programs to meet or exceed environmental standards."* We also ascribe to the Department's objectives of:

- *Proactive policy, comprehensive planning, and effective program development*
- *Timely processing of accurate, effective and defensible permits that are environmentally protective*
- *Strengthen compliance effectiveness*
- *Clean contaminated sites*
- *Achieve certain, consistent, timely enforcement*
- *Enhanced monitoring and assessment*

Carter Creek & Watershed—

In order for the citizens of the Commonwealth and DEQ to meet water quality goals/objectives, as well as the targets of the TMDL established by the Governor and EPA in the 6,119 acre watershed of Carter Creek, it is imperative that the sources of point and non-point sources of pollution be dramatically reduced. The contaminants and pollution to Carter Creek is well documented; excessive nitrogen, phosphorus, fecal coliform bacteria, chlorine and ph, to name a few. These contaminants have resulted in shellfish condemnation orders, excessively low dissolved oxygen, and dramatic declines in aquatic vegetation for decades. The principle sources of these contaminants originate from human waste. The vast majority of septic tanks/filter fields exceed 40 years and many are actually located in the Resource Protection Area (Chesapeake Bay Protection Act). A significant number of on-site systems are not properly functioning due to: absence or inadequate/malfunctioning filter fields, soil limitations and lack of basic operation and maintenance.

Watershed-Scale Actions Needed—

Since all stakeholders in the watershed ***should*** support the goal of improving the water quality in Carter Creek, the Tides Utility, LLC, landowners, and DEQ should be eager to encourage current residences to connect to the subject WWTP. In the application filed by the Tides Utility, LLC, it's abundantly clear that the current plant as well as the planned replacement plant will have ample capacity to handle the wastewater load of the current residences in the area, inclusive of the Greentown neighborhood. This is consistent with the proffer provided by the Tides Lodge property owner to the Board of Supervisors, Lancaster County in 2004. Further, from a technical standpoint, since the Tides Lodge and Tartan Golf Course are no longer generating effluent, in order to maintain this aerobic treatment facility, the Tides Utility, LLC should be soliciting new customers to ensure safe and compliant operation.

Based on DEQ data, the expired permit contained a special condition (Part I.D.6) that required the permittee to maintain Reliability Class I of the facility and the satellite sewage pump station in accordance with 9 VAC 25-790 and that the draft permit currently under consideration, also includes this same condition of continuous operability. In accordance with 9 VAC 25-790-490 *Reliability Protection* this WWTP must have provisions to ensure that the system will "perform its designated function **without failure or interruption of service."**

Since every gallon of untreated waste from the service area must be pumped **up** to the WWTP, it is also vitally important that the satellite sewage collection pump system owned by the Tides Utilities, LLC located on The Tides Lodge property, also comply with Reliability Class I and the Sewage Collection and Treatment (SCAT) Regulations, 9VAC25-790-10 et seq. Any plant/system lacking the mechanism to receive wastewater is of no value to the customers or the environment.

Moreover, it is imperative that this treatment plant deliver continuous operability since it receives wastewater from numerous residences/population from several neighborhoods (HOA's), Tides Lodge Marina, Premier Sailing School and dormitory facility of The Tides Inn. It appears the majority of the wastewater being treated by the WWTP is currently not generated by the owner of the WWTP or its affiliates. However, the permit application does not detail the location or total number of residences currently served, nor the collection system that delivers waste to the WWTP.

Summary—

If the water quality in Carter Creek has a prayer to be improved, the actions/decisions of DEQ and stakeholders will need to be at the watershed-scale level, **NOT** simply on an individual permit-by-permit basis.

Therefore, it is our position that:

- DEQ should approve the permit
- DEQ should require the applicant to comply with Reliability Class I for the WWTP and its satellite collection system
- DEQ should require the applicant to allow current residences with on-site systems, to connect to the WWTP (at the expense of the resident/homeowner)

Thank you for providing this opportunity to comment. Should DEQ decide to conduct a public hearing, please notify us.

Respectfully,

Bruce & Pat Julian
9 Troon Place
Weems, VA 22576

804.438.5016
bruce_julian@hotmail.com

cc:
B. Wally Beauchamp, Supervisor
Dr. Jack S. Russell, Supervisor
Frank A. Pleva, County Administrator
Brian Barnes, Environmental Codes Compliance Officer

Hammond, Andrew (DEQ)

From: Lance Franke [lancefranke@yahoo.com]
Sent: Monday, January 09, 2012 10:54 AM
To: Hammond, Andrew (DEQ)
Cc: chaufournier@yahoo.com
Subject: VPDES Permit Number VA0029343 - Tides Utilities North Wastewater Treatment Plant
Attachments: Waste Treatment Plant Permit Letter 01082010.pdf

Dear Mr. Hammond:

We have attached as a pdf file, a letter concerning the above referenced matter.

Thank you for your attention to this matter.

J. Lance Franke & Stephanie S. Chaufournier

January 7, 2011

Andrew J. Hammond II, P.E.
Water Permit Writer
Department of Environmental Quality
Piedmont Regional Office
4949-A Cox Road
Glen Allen, VA 23060

RE: VPDES Permit Number VA0029343-Tides Utilities North Wastewater Treatment Plant (the "Plant"), the Tides Utilities LLC

Dear Mr. Hammond:

We are writing as (1) interested property owners on Carter's Creek into which the above referenced treatment plant discharges and (2) users of the treatment facility (our property is tapped into the Forced Main serving the plant.) We believe a public hearing on these matters would be helpful to the community to help understand issues surrounding the facility, including access among others.

First, under any circumstances and notwithstanding comments and recommendations that follow, we support and endorse approval of the permit. The reliable operation of the Plant is integral to the water quality of Carter's Creek and it is our goal to see the water quality improved from its current substandard state. Therefore, we encourage any positive actions the Dept. of Environmental Quality (DEQ) can take concerning discharges within the Carters Creek watershed. We believe the Carters Creek watershed has numerous outdated, failing septic systems and filter fields as well as possible straight waste water dumpage (e.g., from the so-called Greentown properties) being discharged into it. It is our understanding that the Plant is operating far below capacity.

Accordingly, it is our recommendation that the DEQ consider as a condition to renewing the permit, requiring the Plant operators seeking the permit to accept waste water from existing residences surrounding the Creek on the side of the former Tartan Golf Club and in Greentown. (Such connection should be at the expense of the connecting property owners or Lancaster County ("County") in the case of Greentown residences, but subject to the operator being able to collect on-going fees from property owners so connected to pay for the plant operation and maintenance. Only nominal initial connection fees should be permitted; such fees not to exceed the applicant's marginal costs of connection or there would be an economic disincentive for residences to connect.)

Of further concern is reliability of the system. We believe the operator should be required to meet all of the regulatory standards including back up power for the Plant and all the related systems to ensure full time operation and no overflow into Carter's Creek e.g., from pump failure below gravity fed residences.

Finally, we believe The Tides Inn or its affiliate, affiliates of the Plant operator, received approvals from the County for planned development of the Tides Lodge property in exchange for their agreement to provide certain treatment or septic facilities for some of the properties within the Carters Creek watershed including the aforementioned Greentown area. However, the County apparently has not enforced this requirement and such facility was never built. As a result, we believe water quality has

been impaired. One caveat: we do not know exactly what the final deal between these parties was when the permit was granted to develop the Tides Lodge property or what the capacity increases were. We do know nothing has been done and the Creek's water quality is the victim. Obviously, there are significant economic issues involved in such an undertaking and we believe the Tides Inn group does care about the water quality in Carters Creek. We do not advocate undue or excessive economic burden being placed on the Tides Inn group (permit applicant or its affiliates.) However, perhaps somehow this issue could be considered by DEQ in considering our recommendation of requiring the operator to broaden access to the Plant as stated above and given the Plant's excess capacity.

Sincerely,

J. Lance Franke &
Stephanie S. Chaufournier

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